DOGAR'S UNIQUE

ACADEMIC YEAR
2023-24

UNIVERSITY OF THE PUNJAB

PU-M

PRE-MEDICAL

Admission Test for Undergraduate Programs

HSSC or Equivalent / Grade 12 Education

MCQs With Explanatory Answers

STUDENT GUIDE

PU-M / Distribution of Marks

Sr. No.	Section	No. of Questions	Marks
1	Verbal Reasoning	20	20 %
2	Quantitative Reasoning	20	20 %
3	Physics	20	20 %
4	Chemistry	20	20 %
5	Biology	20	20 %

Total Marks: 100 Time: 120 Minutes

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STUDY MATERIAL

Criteria and Subject Division	Subject 100% Weight	Page #
Number of Test Items (100 MCQs) Time Allowed 120 Minutes		
■ VERBAL REASONING	20 MCQs	17
Analogy	05	18
Synonym/ Antonym	04	32
Sentence Completion	06	50
Comprehension	05	66
■ QUANTITATIVE REASONING	20 MCQs	81
Arithmetic	05	81
Algebra and Functions	03	115
Geometry	03	122
Equations	03	138
Statistics	03	146
Scenario Based/Mental Mathematics	03	160
■ PHYSICS	20 MCQs	178
■ CHEMISTRY	20 MCQs	214
■ BIOLOGY	20 MCQs	241

پنجاب یونیورسٹی (انڈر گریجویٹ پروگرام) داخلہ ٹیسٹ کے لیے

درخواست دہندگان کے لیے رہنما اصول

1. ہر درخواست دہندہ کو پنجاب یونیورسٹی داخلہ ٹیسٹ کے لیے آن لائن پورٹل کے ذریعے رجسٹر ہونا ضروری ہے۔
2. داخلہ ٹیسٹ پورٹل پر دستیاب لنک کے ذریعے اپنا رول نمبر سلپ ڈاؤن لوڈ کریں۔
3. تصدیق کے لیے اپنی رول نمبر سلپ، میٹرک / ایس ایس سی سرٹیفکیٹ کی تصدیق شدہ کاپی اور اہلیت کا ثبوت اپنے ساتھ لے جائیں۔
4. داخلہ ٹیسٹ درج ذیل پانچ اجزاء پر مشتمل ہوگا:

Sr. No.	Section	Number of Questions	Marks
1	Verbal Reasoning	20	20%
2	Quantitative Reasoning	20	20%
3	Subject-1	20	20%
4	Subject-2	20	20%
5	Subject-3	20	20%

5. پنجاب یونیورسٹی داخلہ ٹیسٹ درج ذیل زمروں میں سے ہوگا:

Test	Category	Subject-1	Subject-2	Subject-3
PU-E	Pre-Engineering	Physics	Chemistry	Mathematics
PU-M	Pre-Medical	Physics	Chemistry	Biology
PU-CSP	Computer Science (Physics)	Physics	Computer Science	Mathematics
PU-CSS	Computer Science (Statistics)	Statistics	Computer Science	Mathematics
PU-GS	General Science	Statistics	Economics	Mathematics
PU-COM	Commerce	Accounting	Economics	Commerce
PU-AHS	Arts, Humanities & Social Sciences	Islamiat/Ethics	Pakistan Studies	General Knowledge

FULLY SOLVED SAMPLE PAPER-2023
UNDERGRADUATE STUDIES ADMISSION TEST
PU-M
(PRE-MEDICAL)
Having 12 years (Intermediate or Equivalent Education)

Verbal Reasoning	**20 MCQs**	**Time: 120 Minutes**
Quantitative Reasoning	**20 MCQs**	**Marks: 100 Marks**
PU-M Subjects:	**60 MCQs**	

Instructions: Please read the following instructions carefully before attempting the paper.

i. 100 MCQs are given on various topics, which carry equal marks. Each correct answer carries 1 mark. Attempt all the questions.
ii. In every question, four / five options are given (A, B, C, D, E), you have to select only one correct option.
iii. Mark your choice by filling in the appropriate circle against each question.
iv. Use ball point pen (black or blue) to shade / blacken the corresponding circle in the answer sheet.
v. The candidates should carefully think about their answer before filling the circles on the answer sheet.
vi. Erasing, cutting or overwriting is not allowed. Once an answer has been given on the answer sheet, the candidate will not be permitted to change any of his/her answer in any way. All such answers will be treated as wrong.
vii. The candidate should not write any thing regarding answers on the question paper. All answers must be given on the answer sheet only.

VERBAL REASONING

ANALOGY

1. Jesus is related to Christians in the same way as Zoroaster is related to .....?
(a) Jews (b) **Parsis✓**
(c) Tribals (d) Catholics

2. South is related to North-West in the same way as West is related to .....?
(a) South-West (b) East
(c) **North-East✓** (d) South

3. Summit is related to Apex in the same way as Summon is related to .....?
(a) Court (b) Judge
(c) Witness (d) **Beckon✓**

4. Distil is related to Whisky in the same way as Brew is related to .....?
(a) Ferment (b) Gin
(c) **Beer✓** (d) Sugar

5. DDT is related to Abbreviation in the same way as LASER is related to .....?
(a) Antithesis (b) **Acronym✓**
(c) Epigram (d) Epithet

SYNONYM:

6. **STRIDENCY:**
   (a) **Harshness✓** (b) Flippant
   (c) Consistency (d) Stress

7. **ACUTE:**
   (a) Curious (b) **Severe✓**
   (c) Accidental (d) Rice

ANTONYM:

8. **OFTEN:**
   (a) Quickly (b) Never
   (c) Never (d) **Sometimes✓**

9. **REJECT:**
   (a) Allow (b) Agree
   (c) Refuse (d) **Accept✓**

SENTENCE COMPLETION

10. **Stop taking drugs lest *you are caught.***
    (A) Might be caught✓ (B) Will be caught
    (C) May be caught (D) Would be caught

11. **It is *all and one* to me whether he lives in Karachi or Hyderabad.**
    (A) All but one (B) All one
    (C) One and the same✓ (D) All or one

12. **In his lecture, he dealt *about* the cause of the Gulf War.**
    (A) With✓ (B) On
    (C) For (D) No improvement

13. **It is *one and quarter hours* since Haris went away.**
    (A) One and quarter (B) One and quarter hour
    (C) One hours and quarter **(D) One hour and a quarter✓**

14. **Where politics fails, economics *may sometime succeed.***
    (A) May sometimes succeeds✓ (B) May sometime succeeds
    (C) Sometimes succeed (D) Sometimes succeeds

15. **He has been working *off and on* for several years to compile a dictionary.**
    (A) Regularly (B) Constantly
    (C) On and off✓ (D) On or off

COMPREHENSION

PASSAGE

"But we do not judge a cricketer so much by the runs he gets as by the way he gets them." In literature as in finance, says Washington Irving, "much paper and much poverty may co-exist." And in cricket, too many runs and much dullness may be associated. If cricket is menaced with creeping paralysis, it is because it is losing the spirit of joyous adventure and becoming a mere instrument for compiling tables of averages. There are dull, mechanical fellows who turn out runs with as little emotion as a machine turns out pins. There is no colour, no enthusiasm, no character in their play. Cricket is not an adventure to them, it is a business. It was so with Shrewsbury. His technical

perfection was astonishing; but the soul of the game was wanting in him. There was no sunshine in his play, no swift surprise of spending unselfishness. And without these things, without gaiety, daring and the spirit of sacrifice cricket is a dead thing. Now the Jam Sahib has the root of the matter in him. His play is as sonny as his face. He is not a miser hoarding up runs, but a millionaire spending them, with a splendid yet judicious prodigality. It is as though his pockets are bursting with runs that he wants to shower with his blessing upon the expectant multitude. It is not difficult to believe that in his little kingdom of Nawanagar where he has the power of life and death in his hands, he is extremely popular, for it is obvious that his pleasure is in giving pleasure.

16. **What is/are true of Shrewsbury?**
I. He was a cricket player.
II. His technical knowledge about cricket was poor.
III. There was no spirit in his play.
(a) I and II (b) **I and III✓**
(c) Only I (d) None of these

17. **The author feels that:**
(a) Technical perfection is not required in playing an enjoyable cricket (b) **He who pays cricket with adventure and enthusiasm makes it enjoyable✓**
(c) He who scores a century must be a good cricketer (d) Cricket is a monotonous game

18. **Jam Sahib:**
(a) Was a splendid cricket player (b) Lived in Nawanagar
(c) Neither (A) nor (B) is true (d) **Both (A) and (B) are true✓**

19. **"In literature as in finance... much paper and much poverty may co-exist." What does it mean?**
(a) Jam Sahib was rich man as he was the king of Nawanagar (b) Shrewsbury was a poor man
(c) **The cricketer who gets lot of runs may not play an enjoyable cricket✓** (d) None of these

20. **What gives cricket its character?**
(a) The spirit of sacrifice (b) The spirit of joyous adventure
(c) The gaiety daring attitude of the player (d) **All of these✓**

QUANTITATIVE REASONING

ARITHMETIC

21. **The chairs in the school hall can be set out in 35 equal rows or in 45 equal rows or in 105 equal rows are:**
a) 600✓ b) 400
c) 40 d) 80

22. **Three bells toll after intervals of 6, 9 and 15 minutes, respectively. If they toll together at 5 p.m., when will they toll together next?**
a) 6 : 30✓ b) 5 : 30
c) 6 : 45 d) 5 : 45

23. It takes Riaz 30 minutes to mark a paper. Razi only need 25 minutes to mark a paper. If they both start marking papers at 11 : 00 AM, what is the first time they will finish marking a paper at the same time?
a) 12 : 30 b) 12 : 45
c) 1 : 30✓ d) 12 : 25

24. Sonia buys two off-cuts of ribbon in a sale. One is 153 cm long. The other is 204 cm long. She cuts them so that she ends up with a number of pieces all the same length. What is the greatest length each piece can be?
a) 39 b) 6
c) 17 d) 51✓

25. A farmer wants to fence a triangular field. He plans to put a fencing post in each corner and place other posts at equal distance along its sides. He wants the posts to be as far apart as possible. The sides of the field are 477 feet 2412 feet and 639 feet long. How far apart will the posts be?
a) 18 feet b) 9 feet✓
c) 27 feet d) 159 feet

B2: ALGEBRA AND FUNCTIONS

26. A solid cylinder of brass 12*cm* high and 6*cm* in radius is melted and recasted into a right circular cone of diameter 16*cm*. Find the height of the cone.
(a) 10.15*cm* (b) 20.25*cm*✓
(c) 28.75*cm* (d) 26.28*cm*

27. The slant height ℓ of a cone with radius of base r and height h is given by $\ell =$
(a) $\sqrt{h^2 + r^2}$ ✓ (b) $\sqrt{h^2 - r^2}$
(c) $\pi r\sqrt{h^2 + r^2}$ (d) $\pi r\sqrt{h^2 - r^2}$

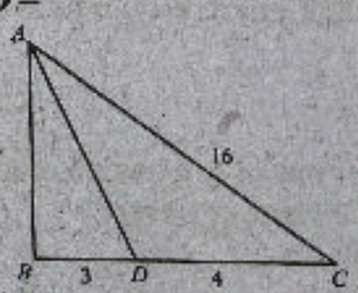
28. If a, b and c are the measures of the sides of a triangle, then area of triangle is
(a) $\sqrt{s(s+a)(s+b)(s+c)}$, where $2s = a + b + c$
(b) $\sqrt{s(s-a)(s-b)(s-c)}$, where $s = a + b + c$✓
(c) $\sqrt{(s-a)(s-b)(s-c)}$, where $3s = a + b + c$
(d) $\sqrt{s(s-a)(s-b)(s-c)}$, where $2s = a + b + c$

GEOMETRY

29. $20° =$
(a) 360′ (b) 630′ (c) 1200′✓ (d) 3600′

30. $\frac{3\pi}{4}$ radians $=$
(a) 115° (b) 135° (c) 150°✓ (d) 30°

31. In the following triangle, $AD =$



(A) $3\sqrt{2}$ (B) $6\sqrt{6}$✓

(C) $6\sqrt{3}$ (D) $3\sqrt{7}$

EQUATIONS

32. If $3x + 17 = 9 - x$, what is the value of x?
(A) 2 (B) 3
(C) -2✓ (D) -3

33. If $x - 5 = 9$, what is the value of $x^2 - 5$?
(A) 196 (B) 191✓
(C) 16 (D) 11

34. If $at - b = c - dt$, what is the value of t in terms of a, b, c and d?
(A) $\frac{b-c}{a-d}$ (B) $\frac{a}{b}$
(C) $\frac{c}{d}$ (D) $\frac{b+c}{a+d}$✓

STATISTICS

35. Primary data and ungrouped data are:
A Same B Opposite
C Not same✓ D Proportional

36. The data which have not undergone any statistical treatment are _____ data.
A Primary✓ B Secondary
C Grouped D None of these

SCENARIO BASED MENTAL MATHEMATICS

37. A tank 30 cm by 20 cm by 10 cm is $^1/_5$ full of water. How much water is in the tank?
(A) 3000 cm^3 (B) 6000 cm^3
(C) 1200 cm^3✓ (D) 1000cm^3

38. During the first year, the population of a town increased by 4% and during the second year it diminished by 4%. If at the end of 2nd year, its population, was 2596, in the beginning it was:
(A) 2,550 (B) 2,600
(C) 2,400 (D) 2,500✓

39. A solution of 27 gallons of acid contains 9 gallons of pure acid. How much water, in gallons, should be added to produce a 25 per cent solution of this acid?
(A) 9✓ (B) 18
(C) 27 (D) 25

40. In a camp, there is provision for 1,600 participants to last 60 days. If the present strength of the camp is 1,200, the provision will last for _____ days.
(A) 96 (B) 86
(C) 80✓ (D) 72

PHYSICS

41. An electric charge in uniform motion produces:
A) An electric field. B) Both magnetic and electric fields.✓

C) A magnetic field. D) Neither magnetic nor electric fields.

42. If 'm' is the mass, 'c' is the velocity of light and $x = mc^2$, then dimensions of 'x' will be:
A) $[LT^{-1}]$ B) $[MLT^{-1}]$
C) $[ML^2T^{-2}]$✓ D) $[MLT^{-2}]$

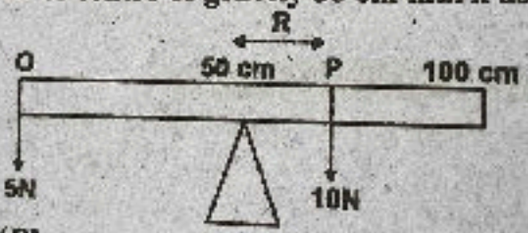
43. For a body to be in complete equilibrium
A) Linear acceleration is zero B) Angular acceleration is zero
C) Linear acceleration is zero but angular acceleration is not zero
D) Linear acceleration and angular acceleration both should be zero✓

44. If a force of magnitude 8 N acts on a body in direction making an angle 30, its x and y
A) $F_X = 4\sqrt{3}$ and $F_y = 8$ B) F_X 4 $\sqrt{3}$ and $F_y = 4$✓
C) $F_X = 8$ and F_y 4 $\sqrt{3}$ D) $F_X = 8\sqrt{3}$ and $F_y = 4$

45. The difference of a vector $\vec{B}$ and its negative vector - $\vec{B}$ is
A) A null vector B) Equal to magnitude of vector $\vec{B}$
C) Twice the magnitude of vector $\vec{B}$ ✓ D) Smaller than magnitude of vector $\vec{B}$

46. Time of projectile's flight is
A) $\frac{v_i^2 \sin^2\theta}{g}$ B) $\frac{v_i^2 \sin\theta}{g}$ C) $\frac{2v_i \sin\theta}{g}$✓ D) $\frac{v_i^2}{g}\sin\theta$

47. Two forces, 5 N and 10 N are acting at 'O' and 'P' respectively on a uniform meter rod suspended at the position of centre of gravity 50 cm mark as shown in the figure.



What is the position of 'P' on meter rod?
A) 80 cm B) 70 cm C) 75 cm✓ D) 65 cm

48. In Millikan's Method, the radius of droplet can be calculated by:
A) $r = \sqrt{\frac{qv_t}{2\rho g}}$ B) $r^2 = \frac{9\eta v_t}{2\rho g}$✓ C) $r^2 = \frac{q\eta v_t}{\rho g}$ D) $r = \frac{9\eta v_t}{2\rho g}$

49. A tiny droplet of oil of density 'ρ' and radius 'r' falls through air under force of gravity. If viscosity of air is 'η', the terminal velocity acquired by the oil drop is given by:
A) $v_t = \frac{4gr^2\rho}{9\eta}$ B) $v_t = \frac{2gr^2\rho}{9\eta}$✓ C) $v_t = \frac{9\eta r^2\rho}{4g}$ D) $v_t = \frac{9\eta r^2\rho}{2g}$

50. In Young's Double Slit Experiment, if the distance between slits and screen is doubled, then fringe spacing becomes:
A) Zero B) Doubles of the original value✓
C) One D) Half of the original value

51. In Michelson's interferometer 792 bright fringes pass across the field of view when its

movable mirror is displaced through 0.233 mm using the equation $I = m\frac{\lambda}{2}$ the wavelength of light used is:

A) 588 nm✓ B) 348 nm C) 620 nm D) 400 nm

52. In Michelson's Experiment, the formula to calculate the speed of light is:

A) $c = 2fd$ B) $c = \frac{16f}{d}$ C) $c = \frac{2\pi f}{d}$ D) $c = 16fd$✓

53. The information received at the other end of a fibre can be inaccurate due to _____ of the light signal.

A) Longer wavelengths C) Intensity
B) Frequency D) Dispersion or Spreading✓

54. The pressure on the other sides and everywhere inside the vessel will be according to the:

A) Pascal's Law✓ C) Boyle's Law
B) Hook's Law D) Charles's Law

55. The value of universal; Gas Constant 'R' is:

A) $8.314\ Jmol^{-2}K^{-1}$ C) $1.38\ Jmol^{-1}K^{-1}$
B) $1.38\ Jmol^{-1}K^{-2}$ D) $8.314\ Jmol^{-1}K^{-1}$✓

56. For adiabatic process, the First Law of Thermodynamics is:

A) $W = \Delta U + Q$ B) $Q = W$
C) $Q = -W$ D) $W = -\Delta U$✓

57. The entropy of the universe always:

A) Decreases C) Remains the same
B) Increases✓ D) Both A and B

58. The work done in moving a unit positive charge from one point to another against the electric field is a measure of:

A) Capacitance B) Potential difference between two points✓
C) Intensity of electric field D) Resistance between two points

59. In Millikan's Method, the radius of droplet can be calculated by:

A) $r = \sqrt{\frac{qv_t}{2\rho g}}$ B) $r^2 = \frac{9\eta v_t}{2\rho g}$✓ C) $r^2 = \frac{q\eta v_t}{\rho g}$ D) $r = \frac{9\eta v_t}{2\rho g}$

60. The scalar product of i and k is:

A) Zero✓ C) 1 B) 90° D) −1

CHEMISTRY

61. A researcher has prepared a sample of 1-bromoropane from 10bg of 1-propanol. Afte purification he had made 12g of product. Which of the following is percentage yield:

A) 60% B) 90% C) 58%✓ D) 50%

62. Which one of the following has same number of molecules as present in 11g of CO purificationi he had made 12g of product. Which of the following is percentage yield:

A) CH_2O B) C_3H_6O C) $C_4H_{12}O_2$✓ D) CH_4O

63. The stability in the following structure is due to the:

A) Disulfide bridges C) presence of unpaired electron in the structur

B) Hyderogen bonding between NH✓ group of one peptide and CO group of another pertide D) weak vander Waals force

64. While finding the relative atomic mass, which of the following standard is used to compare the atomic mass of chlorine (35.5 amu):
A) Carbon – 12✓ C) Carbon – 13
B) Neon – 20 D) Nucleon number

65. Liquid in the container have temperature 70C. What will be temperature in Kelvin scale?
A) 283 K C) 343 K✓
B) 350 K D) 300 K

66. Number of neutrons in $^{66}_{30}Zn$ will be:
A) 30 B) 38 C) 35 D) 36✓

67. The maximum number of electrons in electronic configuration can be calculated by using formula:
A) 2l + 1 B) $2n^2$✓ C) $2n^2 + 2$ D) $2n^2 + 1$

68. Isoptic symbol of ion of sulphur -33 is $^{33}_{16}S^{-2}$. How many no of protons and neutrons are present if the number of electrons are 18:
A) P = 18, n = 15 B) p = 16, n = 16 C) p = 16, n = 17✓ D) p = 17, n = 16

69. Which of the following is the correct equation to calculate relative molecular mass of a gass:
A) M=mRT/PV✓ C) M=mPR/VT
B) M=PV/Mrt D) M=mPRT/V

70. The formula which shows the simplest whole number ratio for the atoms of different elements in a compound is:
A) ionic formula C) empirical formula✓
B) structural formula D) molecular formula

71. In an electrochemical series, standard electrode potentials are arranged on the basis of:
A) pH scale C) Hydrogen Scale✓
B) pOH scale D) pK_a scale

72. The reaction which is responsible for the production of electricity in the Voltaic cell is:
A) Hydrolysis reaction C) Redox reaction✓
B) Oxidation reaction D) Reduction reaction

73, Glucose is converted into ethanol by the enzyme _____ present in yeast:
A) Urease C) Sucrase
B) Invertase D) Zymase✓

74. The rate of reaction involving ions can be studied by _____ method
A) Dilatometric C) Optical rotation
B) Refractometric D) Electrical conductivity✓

75. When one mole of gaseous hydrogen ions are dissolved in water to form an infinitely dilute solution, the amount of heat liberated is
A) -1891 $kJmol^{-1}$ C) -499 $kJmol^{-1}$
B) -1075 $kJmol^{-1}$✓ D) -1562 $kJmol^{-1}$

76. Energy required to remove an electron from the outermost shell of its isolated gaseous atom in the ground state is
A) Electron affinity
B) Lattice energy
C) Ionization energy✓
D) Crystal energy

77. Which of the following carbonates of alkali metals is not stable towards heat and is decomposed on heating to its oxide along with liberation of CO_2?
A) Li_2CO_3✓
B) Mg_2CO_3
C) K_2CO_3
D) Na_2CO_3

78. The presence of calcium is essential for the normal development of plants. An adequate supply of calcium appears to stimulate the development of which part of the plants?
A) Leaves
B) Fruits
C) Root hairs✓
D) Branches

79. Which of the following sulphates is not soluble in water?
A) Sodium Sulphate
B) Barium Sulphate✓
C) Potassium Sulphate
D) Zinc Sulphate

80. The trend in the densities of elements of Group III-A of the Periodic Table is
A) A gradual increase✓
B) A gradual decrease
C) First decrease then increase
D) First increase then decrease

BIOLOGY

81. Which one of the following cell eventually converts to mature sperm?
(A) Spermatids
(B) Secondary spermatocyte
(C) Spermutogonia✓
(D) Primary spermatocytes

82. Which one of the following movement through cell membrane requires energy?
(A) Active transport
(B) Pinocytosis✓
(C) Enetocyces
(D) Passi Transport

83. The most common enzyme in the world is ——
(A) DNA Polymerase
(B) Ribulose
(C) Huligen
(D) Gyrase

84. Part of the Forebrain working as a coordinating centre between Nervous system and Endocrine system is:
(A) Medvlla
(B) Amyglada
(C) Hippocampus✓
(D) Hypothalamus

85. Which carbohydrate is required for the synthesis of ATP
(A) Glucose
(B) Ribolose✓
(C) Fructose
(D) Ribose

86. _____ is involved in the release of anti-diuretic hormone (ADH) involved in water balance.
(A) Anterior pituitary
(B) Adernal Gland
(C) Thyroid Gland✓
(D) Posterior pituitry

87. Isotopes of _____ were used to prove semi conservative model of DNA.....
(A) Ribose
(B) Nitrogen✓
(C) Uranium
(D) Phosphate

88. _____ is the structure of a protein molecule resulting from the regular coiling or folding of the chais of:
(A) Secondary structure✓ (B) Tertiary structure
(C) Quadrary structure (D) Primary structure

89. Membranous sae surrounding the human heart is called:
(A) Myocardium (B) Epicardium
(C) Pericardium (D) Endocardium✓

90. In the stomach, Hydrochloric acid (HCl) is produced by:
(A) Chief cells (B) Oxytocin cells
(C) Poblel cells✓ (D) Zymogen cells

91. Select the muscles which surround the urethra and control its function from the given options.
(A) Fibrous✓ (B) Sphincter
(C) Smooth (D) Cardiac

92. The cell surface membrane surrounding a muscle fiber is called as:
(A) Cestcrape✓ (B) Satcolemna
(C) Tonoplast (D) Plasma membrane

93. Which of the following Enzyme is used to built the new strand of DNA?
(A) DNA reductase (B) DNA endonucleose
(C) DNA tipase✓ (D) DNA pdymerase

94. Unit of inheritance is
(A) Gene (B) Carbon
(C) RNA (D) Histone✓

95. Bicuspid (two-flapped) valve is found between:
(A) Inferior vena cowa & right artrium (B) Right artrium & right ventricle✓
(C) Left artrium & left ventricle (D) Left ventricle & aorta

96. _____ is active process involving the bulk transport of materials in and out of the membrane.
(A) Active Transport (B) Endocytosis & Ectoaytosis
(C) Diffusion (D) Passive Transport✓

97. Air sae of the Lungs are also called?
(A) Bronchioles (B) Para Bronchi✓
(C) Alveoli (D) Bronchi

98. Parathormone is antagonistic to:
(A) Thyroxine (B) Growth Hormone
(C) Increase Blood calcium level (D) Calcitonin✓

99. The substrate molecule has complementary shape with:
(A) Product (B) Cofactors
(C) Active site✓ (D) Enzyme

100. Single ringed pyrimidines are:
(A) Cytocines, Adenine & Thymine✓ (B) Cytocine, Guanine & Uracil
(C) Adenine & Guanine (D) Uracil, Cytocine & Thymine

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A Verbal Reasoning |20 MCQs|

Verbal Reasoning is a vital component of management entrance exams. The questions in this section broadly test abilities in word power, analogies, sentence correction and verbal reasoning. This means that it demands a good vocabulary and a strong command of English. These tests usually involve grammar, **verbal analogies** and following detailed written instructions.

- ***Verbal means 'pertaining to words' and ability means 'power of mind to do things', so in verbal test, questions are stated in the form of words (language).***
- ***The candidates are supplied with a question paper which contains variegated exercises designed to test their knowledge and intelligence.***
- ***The purpose of the 'Verbal Test' is to evaluate and analyze candidate's English comprehension and understanding towards the language.***
- ***These tests can be of various kinds but the questions about sentence completion and analogy testing will be asked randomly.***
- ***There will be also a question about critical reading (comprehension) that will be asked separately.***
- ***The brief explanation about these questions will be given on the next pages.***
- ***This section is consisted of following types of questions:***

| Analogy Test | Synonyms / Antonyms |
| Sentence Completion | Comprehension |

A1 Analogy

|05 MCQs|

Analogies
(مشابہت، مطابقت)

The word analogy means "an agreement or correspondence in certain respects between things otherwise different ---- a resemblance of relations, as in the phrase, "knowledge is to the mind, what light is to the eye": relation in general: likeness: correspondence of a word or a phrase with the genius of a language, as learned from the manner in which its words and phrases are ordinarily formed: similarity of derivative or inflectional processed."

Example 1: Inserting the missing word.

Day is to night as truth is to_____.
Day is to night as truth is to falsehood.

Answer: In the above sentence, the word "falsehood" has been inserted.

Example 2: Which choice gives the answer?

1. Man is to run as bird is to _____.
Choices: *(A)* Fly, *(B)* Run, *(C)* Weak.
Answer: *(A)*

Example 3: Ring is to Finger as Watch is to ____

Choices: *(A)* Arm, *(B)* Wrist *(C)* Leg.
Answer: *(B)*

TYPES OF ANALOGY TESTS

First Type. The first type is that in which two words which have some relationship with each other are presented. These are followed by another word and a number of choices are given. One word from the choices is to be picked up to establish the same relation with the third word as the first two have. For example----

Day is to Night as Cold is to?

(A) Ice *(B)* Wet *(C)* Warm *(D)* Snow

The correct answers is *(C)*.

Day and Night bear the relation of the opposites. As cold is opposite to warm.

Second Type. Part relationship----- In this type of relationship, the two words represent the parts of a bigger thing. For example----

Leaf is to tree as _____.

(A) Head is to body

(B) Sky is to earth

(C) Bomb is to science

(D) Newspaper is to journalist

The correct answer is *(A)*.

In the above quoted example, leaf is a part of a tree. Similarly, head is the part of a body.

Third Type. Another type of analogy is that in which one of the two relationships is not given. One out of the given choices is selected. Example----

Ship is to Fish as _____ is to bird.

(A) Kite *(B)* Feather *(C)* Tree *(D)* Chirp

The correct answer is *(A)*.

Explanation ---- Both ship and fish are found in water. This is the relationship between the two words. Therefore, for bird we will have to pick up kite because both are seen in air.

Practice Test
With Explanatory Answers

DIRECTIONS *for questions 1 to 12: In each of the following questions, a relate pair of words or phrases is followed by five pairs of words or phrases. Select the word pa that best expresses a relationship similar to that expressed in the original pair.*

1. **ADULT: CHILD**

(A) Horse: Mare *(B)* Cat: Kitten *(C)* Swine: Sow

(D) Human: Animal *(E)* Cow: Herd

2. **MANSION: RESIDENCE**

(A) Limousine: Automobile (B) Chandelier: Candle (C) Tuxedo: Wardrobe
(D) Diamond: Rhinestone (E) Yacht: Harbour

3. **ENVELOP: LETTER**
(A) Scarf: Hat (B) Box: Bag (C) Crate: Produce
(D) Neck: Head (E) Blood: Heart

4. **CHOREOGRAPHY: DANCE**
(A) Ceremony: Sermon (B) Agenda: Advertisement (C) Poetry: Recitation
(D) Instrumentation: Conductor (E) Plot: Story

5. **OVERDOSE: PRESCRIPTION**
(A) Deprivation: Materialism (B) Indiscretion: Convention (C) Affliction: Sympathy
(D) Adventure: Expedition (E) Drug: Medicine

6. **EVAPORATE: VAPOR**
(A) Petrify: Stone (B) Centrifuge: Liquid (C) Saturate: Fluid
(D) Corrode: Acid (E) Incinerate: Fire

7. **SHARD: POTTERY**
(A) Flint: Stone (B) Flange: Wheel (C) Cinder: Coal
(D) Fragment: Bone (E) Tare: Grain

8. **MERCENARY: MONEY**
(A) Vindictive: Revenge (B) Scholarly: Library (C) Immaculate: Cleanliness
(D) Thirsty: Water (E) Belligerent: Invasion

9. **HAMMER: ANVIL**
(A) Knocker: Door (B) Stick: Gong (C) Hand: Drum
(D) Pestle: Mortar (E) Gavel: Lectern

10. **NUMB: INSENSITIVE**
(A) Reflect: Luminous (B) Burnish: Lustrous (C) Heckle: Raucous
(D) Repulse: Odious (E) Braid: Sinuous

Explanatory Answers

ANSWER 1.

ADULT: CHILD; An *adult is* what the child becomes when he/she reaches full growth. Thus the relationship between *Adult* and a *Child* is that between a grown-up and growing. Let us see where we see such a relationship among the five options. An *adult* is not an *adult* merely because he/she can see movies that are not for universal exhibition or not merely because they can vote at the elections. An adult is one capable of sexual reproduction.

Option *(A)*: Horse: Mare; A *horse* is the male of the species where the *mare* is the female. Both are necessarily fully-grown. This option will thus not do.

Option *(B)*: Cat: Kitten; The *infant of the cat* is a *kitten* and a *cat* is a fully-grown adult male or female cat, although male adult cats are often called tomcats. Here the relationship matches with that in the capitalised pair and hence Option B.

Option *(C)*: Swine: Sow; The swine is an adult pig and the sow is a female adult pig. Both are necessarily fully-grown. This option will, thus, not do either.

Option *(D)*: Human: Animal; A *human* being is a member of the animal kingdom. The only difference is that *human* beings have the faculty of thinking. Yet Human is the sub-species of the Animal species. This option too will, thus, not do either.

Option *(E)*: Cow: Herd; A *cow* in the singular is one *cow* grazing away, detached from her kith and kin. A *herd* of *cows* would have a number of *cows*. The *cow* is one among the *herd* that is the collective noun for cows. This option too will, thus, not do.

ANSWER 2.

MANSION: RESIDENCE; A *mansion* is a large and stately *residence*. The Divisional Commissioner in our city lives in a *mansion*. The *mansion* is his *residence*. My little cottage in the same lane as his is a simple *residence*. The relationship between Mansion and Residence is that of Large and Stately: Simple. Let us see where this relationship is seen among the options.

Option *(A)*: Limousine: Automobile; When someone says that the President's *limousine* has bulletproof windows, he means that the large and stately car (or *automobile)* is designed to protect him from snipers. When I say that the *automobile* that I bought a year ago is running along smoothly, it means that my ordinary car is in good condition. The relationship between *Limousine* and *Automobile* matches that in the capitalised pair and hence option is correct.

Option *(B)*: Chandelier: Candle; When we sold our ancestral home, the *chandeliers* fetched a considerable sum of money. *Chandeliers* are branched supports for lights that you see hanging from the ceiling. Chandeliers in the modern day hold electric lights but in the early days, they held *candles* since there were no electric lights. Thus a *chandelier* is what holds a number of *candles*. However, a chandelier is not a stately form of a candle. It is at best something that holds *candles*. Thus this option is not workable.

Option *(C)*: Tuxedo: Wardrobe; A *tuxedo* is a short dinner jacket. A *wardrobe* is what holds a person's clothes. The other meaning of *wardrobe* is the collection of the clothes one has. A tuxedo is in the singular. It therefore cannot be the stately form of a wardrobe. A *mansion* if sold would fetch a huge price to the owner as compared to an ordinary residence. A second-hand *tuxedo* may be had for a small sum. If used for long, one may even give it away to the servants. Thus this option is not workable either.

Option *(D)*: Diamond: Rhinestone; A *diamond* is a precious stone. A *rhinestone* is normally an artificial gem cut to resemble a *diamond*. *A* diamond is not necessarily large. It may be as small as a grain or rice. A rhinestone may have a size resembles a large diamond.

There is no relationship between Diamond and Rhinestone that would match Mansion: Residence.

Option *(E)*: Yacht: Harbour; An industrialist may own a *yacht*, which then may be a small luxury boat that the industrialist may use for cruising. A boat-race freak may own a *yacht* that may be a small race boat. Either way, a *yacht* is small and hence fails to relate to a mansion, which is necessarily a large and stately house. This option is not workable either.

ANSWER 3

ENVELOP: LETTER; An *envelope* (or *envelop* as it is spelt in American English) is the outer cover in which a letter is put for sending it. The relationship between an *envelop* and a *letter* is that of an Outer Cover to its Content. Let us see the options and find out where such a relationship emerges.

Option *(A)*: Scarf: Hat; A scarf is usually a long narrow piece of silk worn as a muffler around the neck or as a neckerchief or cravat also worn around the neck but under a shirt collar, or as a bandanna on the head. It has nothing to do whatsoever, with a *hat*. A scarf is not necessarily an outer cover whereas the envelop is necessarily one and therefore this option will not do.

Option *(B)*: Box: Bag; A *box* is an outer cover in which you put things and so is a *bag*. They are both outer covers and hence this option will not do either.

Option *(C)*: Crate: Produce; A *crate* is something in which one normally packs agricultural *produce* such as apples, oranges, mangoes and so on. The relationship between *Crate* and *Produce* matches with that in the capitalised pair. Option C is right.

Option *(D)*: Neck: Head; A neck is not at all a cover. It is what the *head* rests on. This option will also not do.

Option *(E)*: Blood: Heart; The *blood* has to flow within. If it flows out, it means curtains for the one bleeding. It is, in fact, the heart that contains blood in it and hence if at all there relationship between the two, it is in a way inverse to that in the capitalised pair.

ANSWER 4.

CHOREOGRAPHY: DANCE; People can dance in the street without a formal structure to their dance. There is no harmony in a street dance. One dancer raises his hand and the other dancer inadvertently brings his nose in the way of the raised hand and the result is a bleeding nose and then chaos. People can dance on a stage as well.

The difference between street dances and staged performances of dance is that the latter is designed to present the effect of harmonious movements of the dancers. It is for this reason that a staged dance has an arrangement that is decided beforehand by a *choreographer* (meaning someone proficient in the art *choreography* or the art of dancing). Thus the relationship between Choreography and Dance is arrangement (of an event): The event itself. Now let us see the options:

Option *(A)*: Ceremony: Sermon; Let us see when *ceremonies* usually take place and then decide whether *ceremonies* themselves need be by arrangement. There may be a

marriage ceremony, a child's birthday-ceremony a burial ceremony or a ceremony commemorating the valiant soldiers of a nation who have laid down their lives while defending the country. Clearly, ceremonies are necessarily arranged. But as we have seen, while a ceremony may be an arrangement that is decided beforehand, it may not have anything to do with *sermons*. A *sermon*, incidentally, is normally understood as being a religious lecture. But there can be other forms of sermons as well. If a teenager has been regularly going to parties and returning drunk in the dead of the night (meaning the middle of the night) and his father gives a *sermon* to him about his behaviour, then the *sermon* is as such a dressing down or a reprimand. There need not be any ceremony in such a sermon. The father may use profane language and also his hand to drive home the point that he is striving to make, while the priest does not slap the congregation when he delivers a sermon. This option will not do.

Option *(B)*: Agenda: Advertisement; If the Board of Directors of a company were to meet on a particular day to discuss how much dividend should be paid to the shareholders, then the *agenda* of the meeting is to decide how much dividend should be recommended for payment. Here the event is: how much dividend? *Agenda* is thus the arrangement of *things to be discussed.*

If I were to tell my children on a Sunday that we are going out for a stroll and then three hours later, one of them asks me in an irritated tone about what the agenda is, it means that the child now wants to know where we are going and how far. The child wants to know whether anything is decided beforehand, or the whole thing is unscheduled. Here too, the word agenda stands for an arrangement. Here the question is: Where are we going and how far is it now?

An advertisement is issued for the information of the public at large, usually with a view to promoting a product (such as a shampoo of a particular brand, of course, since no company will advertise that people should use shampoo without telling them the brand name that the company have given to their shampoo) or a cause (as in the case of a government advertisement telling citizens to get their children inoculated against polio). An advertisement is not an event. It is a means to inform or bring about the event: in one case the event may be huge sales of a company's branded shampoo and in the other it may be to ensure that every child below, say, five years of age is inoculated against polio. It is for this reason that this option will not do.

Option *(C)*: Poetry: Recitation; *Poetry* is the art of writing poems. Poetry is also the collective noun for poems. Poetry is thus the art or work of a poet. Poetry is itself an arrangement of words that rhyme and poem. *Recitation* is not what poetry seeks to arrange. Poetry may be read quietly. One may take a poetry book, lie down on bed and read without a single word being spoken and therefore the chance of a poetry being heard by the others, if any, in the room is nil. When someone recites, one reads aloud. Someone doing recitation need not recite poetry alone. He may recite a passage from a novel as well. Poetry therefore does not arrange the event of recitation. Thus this option will not do either.

Option *(D)*: Instrumentation: Conductor; *Instrumentation* can mean so many things. If an engineer were looking after the instrumentation of his fertilizer plant, he would be

designing the various instruments to control the reactions and measure the amount of, say, sulphur being poured into the reaction chambers. If the national anthem is to be set to *instrumentation*, then musicians—some with violins, others with oboes, some with drums and so on—will practice how to play it to perfection. *Instrumentation* is thus an arrangement of events such as control of temperature or playing of the national anthem on musical instruments. But the *conductor* cannot be an event. He, in fact, would ensure that those playing the national anthem adhere to the arrangement. This option will then not be of much use. Since it could at best be the reverse of the relationship in the original pair.

Option *(E)*: Plot: Story; Have you heard a story without a *plot*? When we were children, a cousin, who used to tell us *stories* about the exploits of someone called Jack, would go on and on, inventing the plot as he went along. We would plead with him to shut up. To this day we never miss a chance of ribbing (or *teasing*) him for this although he is now a renowned surgeon. A plot is the arrangement of a story and the story is the event that is arranged. This relationship matches the one in the capitalised pair and hence Option E is correct.

ANSWER 5.

OVERDOSE: PRESCRIPTION; An overdose is more than what one should take. The word prescription comes from the word SCRIBE that means *write* and the prefix PRE- that means (i) *before* if you were to *prepone* your journey or go before the scheduled departure or (ii) the plot *earlier in importance* if some belief were to be *prevail*, or (iii) *exceedingly* as in the case of someone being *predominant* in his sphere of specialisation.

When a doctor *prescribes* a particular medicine, he writes the important medicine that one should take. The doctor also writes how much medicine one should take in a single dose and the periodicity of the dosage. You cannot down the whole strip of antibiotics in one gulp. The doctor's prescription is a part of the convention of medicine and its dosage. The word convention means CON- the prefix that means *thoroughly* or *together* and the French verb VENIRE that means *to go*. Convention means *thoroughly going together* and therefore some *accepted usage* in which there must be harmony. A *convent* is a place in which people *thoroughly go* and therefore they stay there and are given thorough religious instruction. This is why a *convent* is where nuns stay.

The relationship between *Overdose* and *Prescription* is between *excess* and *reasonable Quantity*. Now let us see the various options:

Option *(A)*: Deprivation: Materialism; When you pass by a hutment and see the people living there with poor water supply, lack of adequate sanitation and so on, you say that they are living in a state of *deprivation* that means *hardship* or *poverty* or a situation of disadvantage. The word *deprivation* cannot gel with overdose because overdose means excess and deprivation means a shortage. This option will thus not do for this reason alone.

Incidentally, materialism means a tendency to prefer material comforts of life such as cars and air-conditioners and so on instead of spiritual values such as mental peace and knowledge.

Option *(B)*: Indiscretion: Convention; The word *discretion* comes from discern that

means to *understand*. When you understand that beyond three cups of tea per day is not good for your health, then you take tea with *discretion* or moderation. You do not allow yourself an overdose of tea. Indiscretion is the precise opposite. If the doctor tells you that you should take only two tablets of calcium in a day and you down the whole jar, it means that you are acting with indiscretion. You are not reasonable. As we have seen earlier, the doctor prescribes medicines and their dosage in accordance with a *convention* and therefore the relationship between *Indiscretion* and *Convention* matches with that in the capitalised pair. Hence Option B.

Option *(C)*: Affliction: Sympathy; Let us see what *affliction* means from its contextual usage. Diarrhoea in which there is watery bowel movement is a temporary *affliction* (or *disorder)* caused by poisonous or indigestible substance lodged in the intestines. An affliction may be the *effect* of an overdose. *Sympathy* is feeling sorry for others or being affected by the grief of another. It is for this reason that this option will not do.

Option *(D)*: Adventure: Expedition; Overdose means something more than what is reasonable. What is an overdose is not a matter of debate once there is a prescription. Such is not the case with *adventure*. What is adventure and what is more than adventure are both difficult to define simply because there cannot be a limit up to which something can be considered adventure. For a sissy, adventure can stop at walking a mile away from home without one's parents accompanying him. For another person, climbing the world's highest peak is *adventure*. There cannot be an upper limit to adventure whereas for an overdose there has to be an upper limit and hence this option will not do either.

Option *(E)*: Drug: Medicine; The normal meaning of a *drug* is something that can cure an affliction or malady. Medicine is that which a doctor prescribes from accepted usage and hence *medicine* denotes a convention. A drug, however, does not necessarily mean *medicine*. Even hashish is a *drug* and so is marijuana. No doctor will prescribe marijuana. Mere *drug* does not mean overdose at all just as liquor does not mean drinking beyond reasonable quantity. If *drug* itself is not indicative of overdose, this option cannot work.

ANSWER 6.

EVAPORATE: VAPOR; When water *evaporates*, it forms water vapour (spelt VAPOR in American English). When petrol *evaporates*, it forms petrol vapour. The relationship between Evaporate and Vapor is thus between Cause and Effect. Let us now see the options:

Option *(A)*: Petrify: Stone; Have you heard of the word *petroleum?* The word petroleum comes from the Latin PETRA that means rock and OLEUM that means oil. Literally *petroleum* means oil from the rock. When someone becomes so terrified that he cannot move, then he is *petrified* (or in other words *still as a rock)*. A stone as we know is a rock; what is a stone and what is a rock is only a matter of dimension. The small rock is a stone. When the molten lava petrifies, it becomes stone. Here is the Cause and Effect relationship that we are looking for. Thus Option A is correct.

Option *(B)*: Centrifuge: Liquid. The word *centrifuge* comes from CENTRI that means centre and FUGUS that *means flying or fleeing* (have we not heard that *a fugitive* is

the one who commits a crime and then runs *or flees* from the law?). A centrifuge is a mechanical device that spins furiously generating forces that may go up to thousands of times the force of gravity and is used to separate heavier liquids from the lighter ones such as cream from milk. A centrifuge may separate one heavy liquid from another such as milk from cream. But the centrifuge is not the cause of which the liquid is an effect. The *centrifuge* is not a cow, is it? Hence this option will not do.

Option *(C)*: Saturate: Fluid; To *saturate* means to satisfy or overfill. You *saturate* the bed of roses in the garden with water. The relationship between *Saturate* and *Fluid* is that between *something that is done and what it is done with.* This relationship is thus that of effect and cause and hence inverse of what is in the capitalised pair. This option will not do either.

Option *(D)*: Corrode: Acid; When doubts and cynicism *eat away* the self-confidence of a person, they *corrode* that person's self-esteem. When rust *corrodes* the water pipes in buildings, the pipes are *eaten away or eroded.* Acid can *corrode* several metals since acids have the ability to chemically react with a lot of substances and form new substances that may not have the same physical strength or properties of the substances before the reaction with acid. Thus the relationship between *Corrode* and *Acid* is thus that of effect and cause and hence inverse of what is in the capitalised pair. Hence this option will not do either.

Option *(E)*: Incinerate: Fire; The *cinerary* urn is the container that holds the ashes of someone who has been consigned to flames (after death, of course). The key word here is CINIS that means *ashes.* It is normal to see the father of the house separating papers that he needs to preserve and papers that he no longer needs. He then puts a match to papers that he no longer needs and *incinerates* them. When you want to *incinerate* something, you must have *fire.* The relationship between Incinerate and Fire is that of effect and cause and hence inverse of what is in the capitalised pair. Hence this option will not do either.

ANSWER 7.

SHARD: POTTERY; The word *shard* means so many things as follows. All essentially mean a part: fragment, piece, particle, scrap, bit, chip, sliver, splinter, paring, shaving, remnant.

A *shard* is thus a broken piece of pottery. The relationship between Shard and Pottery is that of broken part: whole. It may be noted that Shard and Pottery are not necessarily complementary. If the handle on a teacup has broken off, the broken handle becomes a *shard.* And yet there is nothing to stop you from drinking tea out of such a cup. Only you do not have a handle. The cup can hold tea and you can hold the cup all the same.

Option *(A)*: Flint: Stone; The word flint has several shades of meaning that we shall see in their following situational usages:

- *Flint* to other emotions, the man broke down when his daughter was leaving his home after the marriage ceremony was over. (Here the word *flint* means *hard* or *unyielding).*
- The early man used two pieces *of flint* stone that he rubbed violently against each other and the resultant sparks lit fires.

Clearly, *flint* is a variety of hard stone. Both flint and stone are wholes. There is no Part: Whole, relationship between Flint and Stone and thus this option will not do.

Option *(B)*: Flange: Wheel; The word *flange* means a projecting flat rim, collar, or rib, serving especially for strengthening, attachment, or (on a wheel) maintaining position on a rail. Thus the wheels of trains have *flanges* on them that keep them moving on the rail track; *the flange* is an integral part of the *wheel* and without it the *wheel* will stray from the rail track and the train would then be derailed. The wheel will be of little use without the flange. Thus a *flange* and a *wheel* are complementary where one is useless in the absence of the other.

The relationship between Flange and Wheel is not akin to that between Shard and Pottery because a shard is a broken piece of pottery whereas a *flange* is not a broken part of the wheel.

Option *(C)*: Cinder: Coal; The word *cinder* can mean two things. A *cinder* track is made of *burnt* brick. Motorcycle races are normally held on *cinder* tracks on which the motorcyclist does not slip. If people pick up the *cinder* from wood or *coal* fires, they do so to get residual pieces of partly burnt wood or coal that still have some capacity to burn. The relationship between *Cinder* and *Coal* is that between partly burnt substance and the substance itself. This relationship is also not in keeping with broken part: whole as seen in Shard: Pottery.

Option *(D)*: Fragment: Bone; The word *fragment* comes from the Latin roots FRANG-, FRING-, FRACT-, FRAG- that mean *break*. That is why *a fracture* is a broken bone. That is why something *fragile* is that which can be easily broken. It may be noticed that if one were to know the basic structure of the English language that comes substantially from Latin—the mother of all European languages—it could be immensely helpful. If a man fell from the first storey and a fragment of the bone in his right thumb was picked up before he was rushed to the hospital, it means that a *piece* of his bone was found lying near where he fell. The relationship between Fragment and Bone is akin to broken part and whole and hence option D is correct.

Option *(E)*: Tare: Grain; A *tare* is the seed of a plant grown as fodder. If in the process of cleaning wheat after it is harvested, the *tares* are separated from the wheat, it means that the small fodder seeds that grow alongside wheat are separated from the main grain. The reason for separating tare is that it is about as useful as are stones and stalk that are separated too when wheat is chaffed after harvesting and drying. The relationship between Tare and Grain is akin to unwanted things: wanted things. Thus this option will not do.

ANSWER 8.

MERCENARY: MONEY; A mercenary is a soldier who fights for a country other than that of his birth; the motive for fighting is therefore not patriotism or military service (no country can ask a person other than its national to join its army) but only money. Thus mercenary forces may be hired when one's own forces are felt to be inadequate. The word *mercenary* does not apply merely to warriors. A lady who married an old wealthy man for his money was tired of his peevish temperament and decided to divorce him when she felt that

she should find some way other than a *mercenary* marriage to come into money. Thus the relationship between *Mercenary* and *Money* is that between means and end. Now let us see the options:

Option *(A)*: Vindictive: Revenge; The word *vindictive* comes from the Latin word VINDICTA that means *revenge*. A *vindictive* person does something for the sake of revenge just as a mercenary fights for the sake of money. Let us see what the word vindictive means from the following contextual usage:

Imagine that someone is working in an organisation and has a boss who cannot hear *no* for an answer. Imagine that our friend has asked the boss for a day's leave because his wife has to be taken to the doctor's. The boss declines leave, saying that there is this draft budget to be made and leave can be granted only after the work of drafting the budget is over. Imagine that our friend then tells the boss that because there is a medical emergency, he has come only to inform that he will not be in the next day and not to ask for leave. The boss keeps this refusal, to attend office, in mind. Now imagine that our friend has done an excellent job and is considered for a foreign posting. When asked for his recommendation, the boss reports adversely on our friend. He gets nothing out of this action except mere revenge. The boss is terribly *vindictive*. Thus option A is correct.

Option *(B)*: Scholarly: Library; Someone academically brilliant could be described as *scholarly*. While the books in the library may be the means by which the person reading them may become scholarly, this relationship may at best be seen as end and means. Of course, it is not as if scholars read only in libraries. They may read at home. They may read books that they have purchased. Yet the fact remains that this option will not do.

Option *(C)*: Immaculate: Cleanliness; If a chap's dressing is *immaculate*, he is so well dressed that you cannot find any fault with it. If a man is convinced of his wife's *immaculate* purity, it means that he is sure that there is not a spot, stain or blemish on her loyalty to him. Cleanliness may keep things clean. It is not necessary that a clean person is also of *immaculate* morality. He may bathe thoroughly before setting out to seduce women. But even if something *immaculate* is the result of moral cleanliness, then at the very best the relationship between Immaculate and Cleanliness is that between end and means and hence inverse to that in the capitalised pair. This option too will not do.

Option *(D)*: Thirsty: Water; When a person is *thirsty*, he may want to drink water. Thus thirst is the effect of having been *without* water. However a person may be *thirsty* for success in which case water will be of not much help. In any case, the relationship between Thirsty: Water is not as between means: end and hence the option is not workable.

Option *(E)*: Belligerent: Invasion; A *belligerent* person may mean someone *inclined to war* or *quarrelsome* or *argumentative* person. Someone who goes to a bar and starts drinking may be full of humour when the first peg is resting in his stomach. When the third goes in, he may become *belligerent* (and start *quarrelling* with the bartender who may have advised him that any more liquor may not be good for him). The question of his going to bar does not arise when he is barely able to stand on his feet.

The word invasion comes from the French verb VADERE that means to go and this with the prefix IN- that means *in* (as in *income*) or *upon* or *against* (as in the word *intrude*)

makes INVADE that means to *go upon or enter forcefully*. An *invasion* may thus have several diverse connotations that we shall see in the following contextual - situational (more than contextual as a matter of fact) - usage:

- When the enemy country launched an *invasion* against our country, we were drafted into the army and had to go to war. (Here the word invasion means *war)*
- I was reading my girlfriend's letter when I saw that my younger brother was peeking into the letter. He was thus making an *invasion* (or *intrusion, infringement)* into my privacy.
- In my country, home is protected from invasion by a police officer who will need to have a search warrant issued by a judicial magistrate before he can come in and search the home. But, surprisingly, the Income Tax Department officers seem to have greater powers than the police because they can *invade* the privacy of a man's home without a search warrant. (Here the word *invasion* means *raid).*

The relationship between *belligerent* and *invasion* is like between *someone who tends to do something* and *what he does*. This does not match the relationship between mercenary and money because a mercenary fights for money and thus gets money because of his being a mercenary whereas a belligerent person does not fight for invasion. He may get a broken nose if he is belligerent but not strong enough. Thus this option is not workable either.

ANSWER 9.

HAMMER: ANVIL; Those of you who have seen a shoemaker at work will recall that he puts a shoe on an *anvil* and *hammers* the nail in while the shoe is on the *anvil*. An ironsmith too has an *anvil* on which he puts red-hot iron and uses the hammer to give it the desired shape. The *hammer* and the *anvil* are thus complementary devices just as a tennis racket and a ball. If the ironsmith has only an *anvil* and no *hammer*, with what will he give the desired shape to the iron lemp? Let us see where we find this relationship among the options:

Option *(A)*: Knocker: Door; When someone comes to your house, he rings an electric bell. Imagine that there is a power cut. What use is the electric bell? If he wants to convey that he is at the door, he has to knock. In order that he can do so with ease, a *knocker* is provided on the *door*. However, the *knocker* and the *door* are not complementary because you can make use of the door even without the *knocker*.

Option *(B)* Stick: Gong; If you have seen the gong that was used to strike the bell announcing that school was over for the day and when you ran for the school bus, the sum and substance of the gong was a stick at the end of which there was some hard thing with which you could ring the bell. But the gong and stick are not complementary. The stick is a part of the gong just as the strings are a part of the tennis racket. One can sound the gong even without the stick.

Option *(C)*: Hand: Drum; You could play the *drum* with your *hand*. Yet the *hand* and the *drum* are not complementary. The *drum* will not shy away from you when you try playing it with drumsticks. This option will not do.

Option *(D)*: Pestle: Mortar; The *pestle* is a hammer with which one crushes things placed in a vessel of marble, brass, or other hard material, with a cup-shaped cavity in which ingredients for pharmacy, cookery, etc., are pounded with a *pestle*. This *vessel* is known as a *mortar*. The *pestle* and *mortar* are complementary because if you have put some medicinal herbs into the mortar and wish to crush them, with what can you crush them other than with a *pestle?* One cannot use one's rifle to crush the herbs in a mortar. Thus option D is correct.

Option *(E)*: Gavel: Lectern; One may see the *gavel* in a courtroom when there is too much noise and the judge bangs the *gavel* (or a *small hammer)* on his desk to bring the courtroom back to order. One may see the gavel at an auction when the bidding stops and the highest bidder waits for the chap conducting the auction to bang the gavel on his desk to indicate that the thing that he is auctioning has been sold.

A *lectern* is the stand on which a lecturer puts his notes during the course of his lecture so that he can refer to them. Clearly, a gavel has nothing to do whatsoever, with a lectern.

ANSWER 10

NUMB: INSENSITIVE; When a surgeon operates on a patient's kidney stone, he engages an anaesthetist who in turn injects some drug into the patient's spine so that patient's body *becomes numb* from the waist down, or in other words, the body becomes *insensitive* to pain from waist down. Thus Numb: Insensitive are synonymous. When you see both of them as adjectives? However, the word *numb* can be used as a verb as well. If the cold will numb your fingers, it will freeze them or make them insensitive. Thus *Numb: Insensitive* can bear the relationship of Cause: Effect. Let us now see the options:

Option *(A)*: Reflect: Luminous; While travelling at night on the highway, we see a continuous string of shining objects that tell us where the middle of the road is. This is because when it is dark we cannot see the road - which is black too—and thus are not able to see which is the right side and which is the left side of the road. It is important to know, however, which side is right and which left since in a country where you are required to drive to the left, driving to the right may mean a head-on collision with an approaching vehicle and then curtains. Such devices, called cat's eyes, reflect the light from the headlights of your car and become *luminous* (or shine). However, when you are sitting all by yourself and reflect upon your recent performance at the examinations (meaning, you *think deeply* about where you went wrong and how you would do better hereafter and so on), you do not develop a *luminous* glow. Thus there is no necessary relationship between Reflect and Luminous.

Option *(B)*: Burnish: Lustrous; When you *burnish* the silver tea set with an oxidant, you *polish* the silver. The silver that was dull now becomes *lustrous*. When someone compliments you for the fine burnish on the tea set, he is complementing you for the excellent *polish* on the silver. The word *burnish* can thus be used as a noun and also as a verb just as the word *run* can be a noun when you have scored a hundred *runs* and as a verb when you *run* to catch the bus home. You burnish something to make it lustrous, just as the cold that will numb the fingers, will make them insensitive. Thus option B is correct.

Option *(C)*: Heckle: Raucous; Imagine that a drama with a misleading title is being

enacted at a theatre and some members of the audience, who have come with the hope of hearing jokes, are not thrilled with the deeply philosophical soliloquy that the star of the show has launched. These simple folks then start *heckling* the actor *(sit down and give yourself rest,* they shout). One would heckle with the intention of making the actors nervous or jeer at them in a *raucous* or *jarring, ear-piercing* voice. Thus a chap would *heckle* in a raucous voice if he has any hope of being heard by the actors. There are two parties to the transaction of Numb and Insensitive. The first party is the one who makes numb and the second party is the other who becomes insensitive. In the case of *Heckle* and *Raucous* there is only one party—the heckler. He *heckles* and his voice becomes raucous. The actor may have acted in hundreds of plays and may have seen both the dark and the bright side of acting. It is not necessary that the actor may become raucous because of the heckler. He may be entirely unaffected by the *heckling.* He may even smile in the direction of the heckler.

Option *(D)*: Repulse: Odious; If you have heard or felt someone's *pulse,* it indicates the heartbeats. The word *repulse* has the prefix RE- that means *back* and therefore means *beat back.* So when the young lieutenant *repulsed* the enemy attack, he *beat* the enemy *back.* They had to retreat. On the other hand, when you were out on your usual morning walk and the sight of the rotting dead animal *repulsed* you, it beat you back or *disgusted* you.

A child that throws tantrums all the while may be an *odious* or *hateful* child. If a country makes it compulsory for all adults below the age of, say, forty-five to join the army in the current battle against another nation, it would seem *odious* (or hateful) to most of its citizens. Something hateful, like the rotting corpse on a morning walk, may *repulse.* The relationship between *Repulse* and *Odious* is that between effect and cause. Thus this option will not work.

Option *(E)*: Braid: Sinuous; If a fellow were to be slapped while trying to put a carnation in the *braid* of the new girl in his class, he is trying to put a flower in her *plait* (interwoven locks of hair). If the road to the hill station is *sinuous,* it goes up *winding.* If the girl in whose braid the fellow was trying to put a flower now seems to like him because of his *sinuous* body, it means that he has a *lithe, supple* body (in which there is the likelihood of many curves). If *sinuous* oil merchants dominated the Chamber of Commerce in your town, then it means that the few oil merchants dominating the Chamber of Commerce are *crooked.* The words *braid* and *sinuous* have no relation as such and therefore this option will not do.

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A2 Synonyms / Antonyms

|04 MCQs|

Synonyms: It may be possible to choose the correct answer by rejecting those words that simply cannot be the proper choice. This is done by a process of reasoning and elimination. However, you are advised to use this process only when you are not certain of answer. Remember that this process is very time-consuming.

Solved Example:

Directions: *In the following question, choose the word which is most nearly the same in meaning to the* **bold** *word and mark it in the Answer Sheet.*

Example: High:

(a) Tall (b) Short
(c) Fat (d) Thin

Explanation: Here the word 'tall' is the nearest in meaning to the word 'high'. So, 'A' is the correct answer.

Examination Questions

1. **He delivered a lengthy speech in which he committed several ludicrous mistakes.**
   (a) Serious (b) **Absurd**✓
   (c) Funny (d) Glaring
2. **Timely first aid resuscitated the patient.**
   (a) Cured (b) **Revived**✓
   (c) Rescued (d) Soothed
3. **His rustic speech and clothes led us to think of him as an ignorant villager.**
   (a) Unconventional (b) Old-fashioned
   (c) **Unsophisticated**✓ (d) Strange
4. **The unprecedented drought in several parts of the country this year led to the onset of various diseases.**
   (a) **Outbreak**✓ (b) Onslaught

How to Attempt Synonyms:

1. Whenever possible, the question-word & answer-word must be the same part of speech. For example, if the question-word is in the past tense, the answer should also be in the past tense, and so on.
2. A favourite trick of the examiner is to include antonym in answer choices for a synonym question. Be careful about what is asked before answering a question.
3. Don't fumble if you don't get the dictionary meaning. You are only expected to choose the word, which has most nearly the same meaning.
4. Don't ponder over a question for too long. It is better to answer first those questions you know. Then come back to those that you don't know.
5. It may be possible to choose the correct answer by rejecting those words that simply cannot be the proper choice. This is done by a process of reasoning and elimination. However, you are advised to use this process only when you are not certain of the answer. *Remember that this process is very time-consuming.*

But the point is that there are nothing like exact synonyms, but there are words which are similar in meaning. So, choosing the right word is a test of your overall knowledge of English rather than vocabulary.

(c) Attack (d) Assault

5. **The thief's shifty eyes betrayed his guilt.**
(a) Crafty (b) Wily
(c) Deceitful (d) **Slippery✓**

6. **His ragged clothes effectively hide the opulent life he leads at home.**
(a) Obscure (b) Comfortable
(c) **Rich✓** (d) Hard-working

7. **The cricketer has denied his complicity in match-fixing.**
(a) Conspiracy (b) Collusion
(c) Collaboration (d) **Connivance✓**

8. **FRIGHTENED:**
(a) Vibrating (b) Crying
(c) Amazed (d) **Terrified✓**

9. **INGREDIENTS:**
(a) Spices (b) Nuts
(c) **Constituents✓** (d) Condiments

10. **TAKE ADVANTAGE OF:**
(a) Use the time (b) **Make use of✓**
(c) Help (d) Earn profit
(e) Harm

11. **RUDIMENTARY:**
(a) A rumour (b) Powerful
(c) **Basic✓** (d) Rude

12. **SULTRY:**
(a) Solvable (b) Sticky
(c) Salty (d) **Hot and humid✓**

13. **CLOG:**
(a) **To block✓** (b) A cover
(c) A bump (d) To push forward

14. **BEQUEATH:**
(a) Helpful (b) **To leave by will✓**
(c) Suffer to death (d) Under the ground

15. **ASTRAY:**
(a) Far off (b) Spanning
(c) Out (d) **Off the right path✓**

16. **Several members of the party eulogized their leader at the public meeting.**
(a) Thanked (b) **Praised✓**
(c) Wished (d) Flattered

17. **One cannot but admire your ingenious solution to the problem.**
(a) Appropriate (b) Original
(c) **Skilful✓** (d) Final

18. **The financial crisis caused the fall of the Government.**
(a) Brought over (b) Brought down
(c) Brought forward (d) **Brought about✓**

19. **The NRIs who are eager to invest in Pakistan are discouraged by the archaic rules and procedures.**
(a) Ancient (b) Complex
(c) **Outdated✓** (d) Earlier

20. **The chief engineer was irritated by the perpetual complaints.**
(a) **Repeated✓** (b) Baseless
(c) Eternal (d) Trivial

21. **STRIDENCY:**
(a) **Harshness✓** (b) Flippant
(c) Consistency (d) Stress

22. **EXCULPATE:**
(a) Speak (b) Enjoy
(c) Free (d) **Finish✓**

23. **VAPID:**
(a) Virtuous (b) Lustre
(c) **Dull✓** (d) Vital

24. **DISQUISITION:**
(a) Explosion (b) Progress
(c) Motion (d) **Report✓**

25. **COLLATE:**

(a) Prescribe (b) Narrate
(c) Describe (d) **Assemble✓**

26. **PREPOSTEROUS:**
(a) Ceremonious **(b) Ridiculous✓**
(c) Judicious (d) Formal

27. **DOMINION:**
(a) Realm✓ (b) Issue
(c) Separation (d) Recreation

28. **ATTEST:**
(a) Enlarge (b) Assign
(c) Corroborate✓ (d) Allure

29. **QUALM:**
(a) Attribute (b) Altercation
(c) Scruple✓ (d) Crisis

30. **It is amazing how such a motley group could get along so well.**
(a) Confused (b) Promiscuous
(c) Assorted **(d) Heterogeneous✓**

31. **His speech was nothing but a string of platitudes.**
(a) Humorous anecdotes (b) Noble sentiments
(c) Stereo-typed statements✓ (d) Grand statements

32. **This was her maiden performance and she did very well.**
(a) Primary **(b) First✓**
(c) Girlish (d) Fresh

33. **He wrote a scathing review of the prize-winning novel.**
(a) Subjective (b) Unbalanced
(c) Scornful✓ (d) Biased

34. **She is meticulous about her appearance.**
(a) Worried (b) Careful
(c) Proud **(d) Methodical✓**

35. **The cancer of domestic misery corroded his whole existence.**
(a) Affected (b) Afflicted
(c) Disrupted **(d) Destroyed✓**

36. **He suffered from excruciating pain after he got home from the hospital.**
(a) Abrupt **(b) Severe✓**
(c) Imaginary (d) Mild

37. **His candid opinions have won him many friends.**
(a) Frank✓ (b) Generous
(c) Courteous (d) Kind

38. **I am disgusted by our outrageous behaviour.**
(a) Threatening **(b) Shocking✓**
(c) Unbecoming (d) Unacceptable

39. **We repeatedly asked the girl why she was crying but she said that she did not want to entangle us in her affairs.**
(a) Induce **(b) Involve✓**
(c) Impress (d) Entrap

40. **His performance in the examination stunned his friends.**
(a) Subdued (b) Angered
(c) Stupefied✓ (d) Surprised

41. **More effective measures should be adopted for the conservation for forest.**
(a) Supervision (b) Propagation
(c) Cultivation **(d) Protection✓**

42. **Will you please rectify the mistake?**
(a) Correct✓ (b) Regularize
(c) Condone (d) Clarify

43. **Death is inevitable.**
(a) Imminent (b) Uncontr-ollable
(c) Unavoidable✓ (d) Uncon-querable

44. **Some people try to spread anarchy in the country.**
(a) Lawlessness✓ (b) Disaffection
(c) Violence (d) Hatred

45. **The meeting came to an abrupt end.**
(a) A sad (b) An awful

(c) An unexpected (d) A sudden✓

46. He is very impulsive in everything he does.
(a) Impressive (b) Rash✓
(c) Wary (d) Deliberate

47. Because of his haughty temperament, he cannot have many friends.
(a) Impatient (b) Violent
(c) Ill-natured (d) Arrogant✓

48. He is often accused of having a vindictive attitude towards his critics.
(a) Revengeful✓ (b) Rude
(c) Cruel (d) Harsh

49. The travel agent will confirm my reservations for next week's flight to London.
(a) Ratify (b) Verify✓
(c) Obtain (d) Approve

50. He kept his eyes peeled and his ears pricked for some important clue.
(a) Signal (b) Intimation
(c) Inkling (d) Hint✓

51. Weird noises came from the haunted house.
(a) Unnatural✓ (b) Frightening
(c) Unpleasant (d) Beastly

52. The guests were offended by his uncouth manners.
(a) Ungracious✓ (b) Undesirable
(c) Dirty (d) Wasteful

53. His dress was immaculate.
(a) Simple (b) Gorgeous
(c) Coloured (d) Spotless✓

54. The man vehemently denied all the charges of corruption that were levelled against him.
(a) Forcefully✓ (b) Hysterically
(c) Serenely (d) Devoutly

55. Plants that grow and exist in desert have highly specialized means of adapting themselves to the arid environment.
(a) Dry✓ (b) Withering
(c) Unless (d) Unproductive

56. He was trying to put across his ideas to his audience.
(a) To influence (b) To convince
(c) To cross (d) To covey✓

57. The growing disparity between the rich and the poor has been a cause for concern for those who are committed to the establishment of a just and egalitarian social order.
(a) Segregation (b) Inequality✓
(c) Diversity (d) Unity

58. PLEASURE:
(a) Anxiety (b) Grief
(c) Happiness✓ (d) Disappointment

59. RIVAL:
(a) Opponent✓ (b) Associate
(c) Partner (d) Friend

60. GENERATE:
(a) Produce✓ (b) Command
(c) Race (d) Prefer

61. ACUTE:
(a) Curious (b) Severe✓
(c) Accidental (d) Rice

62. LATENT:
(a) Display (b) Visible
(c) Concealed✓ (d) Hard

63. ROBUST:
(a) Stupid (b) Able✓
(c) Useless (d) Wear

64. LENIENT:
(a) Harsh (b) Kind✓

(c) Rough (d) Cruel

65. DESTRUCTION:
(a) Replacement (b) Renovation
(c) Ruin✓ (d) Restoration

66. GENUINE:
(a) Proper (b) Authentic✓
(c) Germinate (d) Correction

67. IRRELEVANT:
(a) Immature (b) Not connected✓
(c) Illegible (d) Irregular

68. UGLY:
(a) Fearful (b) Hateful
(c) Repulsive✓ (d) Evil

69. GRAND:
(a) Aristocratic (b) Noble
(c) Splendid✓ (d) Great

70. CAUTIOUSLY:
(a) Somewhat (b) Secretly
(c) Genuinely (d) Carefully✓

71. RELUCTANT
(a) Ready (b) Unwilling✓
(c) Worried (d) Inclined

72. FALSE:
(a) Defective (b) Untrue✓
(c) Incorrect (d) Inaccurate

73. CONDEMN:
(a) Underrate (b) Hate
(c) Blame✓ (d) Avoid

74. INSOLENT:
(a) Nervous (b) Rude✓
(c) Proud (d) Assertive

75. LIBERAL:
(a) Generous (b) Progressive✓
(c) Educated (d) Tolerant

76. ADVERSITY:
(a) Mediocrity (b) Misfortune✓
(c) Failure (d) Mishap

77. DISTINGUISH:
(a) Darken (b) Differentiate✓
(c) Confuse (d) Abolish

78. I shall <u>disclose</u> your identity if you do not speak the truth.
(a) Reveal✓ (b) Report
(c) Blackmail (d) Express

79. I would not have built a hose here but for the engineer's <u>assurance</u> that this area never has floods.
(a) Guarantee✓ (b) Suspicion
(c) Belief (d) Suggestion

80. The car accident was the <u>consequence</u> of his carelessness.
(a) Conclusion✓ (b) End
(c) Proof (d) Result

81. How could the thief gain <u>access</u> to the bank lockers?
(a) Nearness✓ (b) Entry
(c) Exit (d) Permission

82. The boy is <u>anxious</u> to learn as much as he can.
(a) Worried (b) Eager✓
(c) Forced (d) Serious

83. MOISTURE:
(a) Defect (b) Dampness✓
(c) Delicate (d) Dryness

84. COUNSEL:
(a) Correct (b) Publish
(c) Oppose (d) Advise✓

85. AUDACIOUS:
(a) Daring✓ (b) Venture
(c) Obvious (d) Manifest

86. CITE:
(a) Place (b) Sight
(c) Quote✓ (d) Good

87. CHAOS:

(a) Mould (b) Disturb
(c) Inexperienced (d) Lawlessness✓

88. **AFFLUENT:**
(a) Close (b) **Prosperous✓**
(c) Poor (d) Talkative

89. **It was Suhail's practice to get up early and go for a walk before breakfast.**
(a) Rule (b) Fashion
(c) **Habit✓** (d) Convention

90. **Madiha asked Irum not to meddle in her affairs.**
(a) Intercede (b) Impose
(c) Cross (d) **Interfere✓**

91. **My friends promised to look up my sister whenever they went to London.**
(a) Greet (b) Contact
(c) **Visit✓** (d) Survey

92. **We must eradicate corruption.**
(a) Minimise (b) **Uproot✓**
(c) Condemn (d) Control

93. **Grandfather has been getting feeble of late.**
(a) Tall (b) Small
(c) Big (d) **Weak✓**

94. **RELUCTANT:**
(a) **Unwilling✓** (b) Curious
(c) Enthusiastic (d) Agreeable

95. **TENSE:**
(a) Cosy (b) **Uncomfortable✓**
(c) Easy (d) Relaxed

96. **EXTINCT:**
(a) Unimportant (b) **Obscure✓**
(c) Irrelevant (d) Useless

97. **SIGNIFICANT:**
(a) Expressive (b) Alive
(c) Extreme (d) **Distinct✓**

98. **EXTRAVAGANT:**
(a) Narrow-minded (b) Mean
(c) **Uneconomical✓** (d) Miserly

99. **APPLAUD:**
(a) Flatter (b) Pray
(c) **Praise✓** (d) Request

100. **ABUNDANT:**
(a) Excessive (b) **Plentiful✓**
(c) Heavy (d) Long

101. **THRIVE:**
(a) **Prosper✓** (b) Entertain
(c) Revive (d) Survive

102. **ECONOMISE:**
(a) Accumulate (b) Minimise
(c) **Save✓** (d) Reduce

103. **GRUESOME:**
(a) Clear (b) Fresh
(c) Rude (d) **Horrible✓**

104. **DOUBT:**
(a) **Disbelief✓** (b) Mistake
(c) Dullness (d) Ignorance

105. **TRIUMPH:**
(a) Joy (b) Gain
(c) **Victory✓** (d) Excitement

106. **OUTSTANDING:**
(a) Interesting (b) Notorious
(c) **Prominent✓** (d) Admirable

107. **VOLUMINOUS:**
(a) Loud (b) Shining
(c) **Bulky✓** (d) Long

108. **HOMELY:**
(a) Beautiful (b) Smooth
(c) **Simple✓** (d) Rough

109. **EXTRAVAGANT:**
(a) Proud (b) Unlimited
(c) **Wasteful✓** (d) Expensive

110. **CRUEL:**
(a) Hateful (b) Dreadful
(c) **Merciless✓** (d) Indifferent

111. **MAJESTIC:**
(a) Attractive (b) Interesting
(c) **Grand✓** (d) Extraordinary

112. **MARVELLOUS:**
(a) **Wonderful✓** (b) Attractive
(c) Charming (d) Pleasing

113. **JEOPARDY:**
(a) Enmity (b) **Danger✓**
(c) Magic (d) Adventure

114. **EMULATE:**
(a) **Trying to do as well✓** (b) In spite to win
(c) Enable (d) Likely to be late

115. **ERADICATE:**
(a) Complicate (b) Dedicate
(c) Indicate (d) **Eliminate✓**

****

Explanatory Answers

1. (B): *Ludicrous* means ridiculous. Its synonym is 'absurd'.
2. (B): *Resuscitated* means brought back to consciousness. Its synonym is 'revived'.
3. (C): *Rustic* means uncouth. Its synonym is 'unsophisticated'.
4. (A): *Onset* means beginning. Its synonym is 'outbreak'.
5. (D): *Shifty* means vacillating. Its synonym is 'slippery'.
6. (C): *Opulent* means wealthy. Its synonym is 'rich'.
7. (D): *Complicity* means association for wrongdoing. Its synonym is 'connivance'.
8. (D): *Frightened* means scared. Its synonym is 'terrified'.
9. (C): *Ingredients* means various parts. Its synonym is 'constituents'.
10. (B): *Take advantage of* means exploit. Its synonym is 'make use of'.
11. (C): *Rudimentary* means existing in an imperfect or their developed form. Its synonym is 'basic'.
12. (D): *Sultry* means characterized by or emiting oppressive heat. Its synonym is 'hot and humid.'
13. (A) *Clog* means to encumber or impede. Its synonym is 'to block'.
14. (B): *Bequeath* means to hand down. It synonym is 'to leave by will'.
15. (D): *Astray* means to become mislaid. Its synonym is 'off the right path'.
16. (B): *Eulogized* means appreciated. Its synonym is 'praised'.
17. (C): *Ingenious* means clever. Its synonym is 'skilful'.
18. (D) *Caused* means led to. Its synonym is 'brought about'.
19. (C): *Archaic* means obsolete. Its synonym is 'outdated'.
20. (A): *Perpetual* means time and again. Its synonym is 'repeated'.
21. (A): *Stridency* means aggressiveness. Its synonym is 'harshness'.
22. (D): *Exculpate* means destroy. Its synonym is 'finish'.
23. (C): *Vapid* means listless. Its synonym is 'dull'.
24. (D): *Disquisition* means inquiry. Its synonym is 'report'.
25. (D): *Collate* means collect. Its synonym is 'assemble'.
26. (B): *Preposterous* means not real or practical. Its synonym is 'ridiculous'.
27. (A): *Dominion* means region or territory. Its synonym is 'realm'.

28. (C): *Attest* means verify. Its synonym is 'corroborate'.
29. (C): *Qualm* means sudden feeling of nervousness. Its synonym is 'scruple'.
30. (D): *Motley* means different types of people or things. Its synonym is 'heterogeneous'.
31. (C): *Platitudes* means commonplace remarks. Its synonym is 'stereo-typed statements'.
32. (B): *Maiden* means in the original or initial state. Its synonym is 'first'.
33. (C): *Scathing* means severe or harsh. Its synonym is 'scornful'.
34. (D): *Meticulous* means particular. Its synonyms is 'methodical'.
35. (D): *Corroded* means ruined. Its synonym is 'destroyed'.
36. (B): *Excruciating* means unbearable. Its synonym is 'severe'.
37. (A): *Candid* means outspoken. Its synonym is 'frank'.
38. (B): *Outrageous* means rude. Its synonym is 'shocking'.
39. (B): *Entangle* means get caught. Its synonym is 'involve'.
40. (C): *Stunned* means taken aback. Its synonym is 'stupefied'.
41. (D): *Conservation* means nurturing. Its synonym is 'protection'.
42. (A): *Rectify* means amend. Its synonym is 'correct'.
43. (C): Inevitable means something that is bound to happen. Its synonyms is 'unavoidable'.
44. (A): Anarchy means chaos. Its synonym is 'lawlessness'.
45. (D): Abrupt means with a jerk. Its synonym is 'a sudden'.
46. (B): Impulsive means without thought. Its synonym is 'rash'.
47. (D): Haughty means vain. Its synonym is 'arrogant'.
48. (A): Vindictive means fired by revenge. Its synonym is 'revengeful'.
49. (B): Confirm means to reiterate. Its synonym is 'verify'.
50. (D): Clue means an indication. Its synonym is 'hint'.
51. (A): Weird means strange. Its synonym is 'unnatural'.
52. (A): Uncouth means uncultured. Its synonym is 'ungracious'.
53. (D): Immaculate means clean. Its synonym is 'spotless'.
54. (A): Vehemently means emphatic. Its synonym is 'forcefully'.
55. (A): Arid means without any rain or monsoons. Its synonym is 'dry'.
56. (D): Put across means to communicate. Its synonym is 'to convey'.
57. (B): Disparity means difference. Its synonym is 'inequality'.
58. (C): Pleasure means enjoyment. Its synonym is 'happiness'.
59. (A): Rival means one that competes with another. Its synonym is 'opponent'.
60. (A): Generate means to bring into being. Its synonym is 'to produce'.
61. (B): Acute means sharp. Its synonym is 'severe'.
62. (C): Latent means hidden. Its synonym is 'concealed'.
63. (B): Robust means strong. Its synonym is 'Able'.
64. (B): Lenient means mild. Its synonym is 'kind'.
65. (C): Destruction means overthrow. Its synonym is 'ruin'.
66. (B): Genuine means not artificial. Its synonym is 'authentic'.
67. (B): Irrelevant means not to the point. Its synonym is 'not connected'.
68. (C): Ugly means unpleasing. Its synonym is 'repulsive'.
69. (C): Grand means majestic. Its synonym is 'splendid'.
70. (D): Cautiously means heedfully. Its synonym is 'carefully'.
71. (B): Reluctant means disinclined. Its synonym is 'unwilling'.
72. (B): False means wrong. Its synonym is 'untrue'.
73. (C): Condemn means guilty. Its synonym is 'blame'.

74. (B): Insolent means is insulting. Its synonym is 'rude'.
75. (B): Liberal means open minded. Its synonym is 'progressive'.
76. (B): Adversity means distress. Its synonym is 'misfortune'.
77. (B): Distinguish between draw distinctions. Its synonym is 'differentiation'.
78. (A): Disclose means to make open. Its synonym is 'reveal'.
79. (A): Assurance means satisfaction. Its synonym is 'guarantee'.
80. (A): Consequence means effect. Its synonym is 'result'.
81. (A): Access means reaching. Its synonym is 'nearness'.
82. (B): Anxious means looking forward to. Its synonym is 'eager'.
83. (B): Moisture means wetness. Its synonym is 'dampness'.
84. (D): Counsel means persuade. Its synonym is 'advise'.
85. (A): Audacious means bold. Its synonym is 'daring'.
86. (C): Cite means illustrate. Its synonym is 'quote'.
87. (D): Chaos means disorder. Its synonym is 'lawlessness'.
88. (B): Affluent means wealthy. Its synonym is 'prosperous'.
89. (C): Practice means usual or customary action. Its synonym is 'habit'.
90. (D): Meddle means to involve oneself unwarrantedly. Its synonym is 'interfere'.
91. (C): Look up means to call on. Its synonym is 'visit'.
92. (B): Eradicate means to pull up by roots. Its synonym is 'uproot'.
93. (D): Feeble means frail. Its synonym is 'weak'.
94. (A): Reluctant means hesitant. Its synonym is 'unwilling'.
95. (B): Tense means under mental or emotional 'strain'. Its synonym is 'uncomfortable'.
96. (B): Extinct means 'no more in existence'. Its synonym is 'obscure'.
97. (D): Significant means important. Its synonym is 'distinct'.
98. (C): Extravagant means 'wasteful'. Its synonym is 'uneconomical'.
99. (C): Applaud means to appreciate. Its synonym is 'praise'.
100. (B): Abundant means more than what is required. Its synonym is 'plentiful'.
101. (A): Thrive means to do well. Its synonym is 'prosper'.
102. (C): Economise means to spend less. Its synonym is 'save'.
103. (D): Gruesome means frightening. Its synonym is 'horrible'.
104. (A): Doubt means suspicion. Its synonym is 'disbelief'.
105. (C): Triumph mean achievement. Its synonym is 'victory'.
106. (C): Outstanding means extraordinary. Its synonym is 'prominent'.
107. (C): Voluminous means big. Its synonym is 'bulky'.
108. (C): Homely means plain. Its synonym is 'simple'.
109. (C): Extravagant means exorbitant. Its synonym is 'wasteful'.
110. (C): Cruel means callous to others. Its synonym is 'merciless'.
111. (C): Majestic means splendid. Its synonym is 'grand'.
112. (A): Marvelous means amazing. Its synonym is 'wonderful'.
113. (B): Jeopardy means risk or hazard. Its synonym is 'danger'.
114. (A): Emulate means 'to imitate'. Its synonym is 'trying to do as well'.
115. (D): Eradicate means 'to finish off. Its synonym is 'eliminate'.

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Antonyms: Antonym is a word which has an OPPOSITE meaning of the given word. The best source of enhancing vocabulary is by general conversation and extensive reading.

Examination Questions

1. **ABATE:**
   (a) Postpone (b) Abandon
   (c) Diminish (d) **increase**✓
2. **LUCID:**
   (a) **Confusing**✓ (b) Weird
   (c) Austere (d) Bitter
3. **AMALGAMATE:**
   (a) Righteous (b) **Segregate**✓
   (c) Blend (d) Inattentive
4. **MERCURIAL:**
   (a) Erratic (b) **Fastidious**✓
   (c) Sloppy (d) Stable
5. **PRUDENT:**
   (a) **Indiscreet**✓ (b) Parochial
   (c) Vain (d) Customary
6. **We must remember that like all other things, days of <u>prosperity</u> will end too.**
   (a) Misfortune (b) Disaster
   (c) **Adversity**✓ (d) Trouble
7. **The court jester was allowed to make <u>derogatory</u> remarks about the king and yet get away with it.**
   (a) Humorous (b) Commendable
   (c) **Complimentary**✓ (d) Emotional
8. **There was a <u>rueful</u> expression on the face of the old lady.**
   (a) Hopeful (b) Wistful
   (c) Sorrowful (d) **Cheerful**✓
9. **He pleaded for the modernization of the factory <u>enthusiastically</u>.**
   (a) Dispassionately (b) Reluctantly
   (c) **Indifferently**✓ (d) Unconvincingly
10. **The novel is remarkable for its <u>graphic</u> descriptions of the city's underworld.**
    (a) Vague✓ (b) Short
    (c) Vivid (d) Prejudiced

How to Attempt Antonyms:

1. Whenever possible, the question-word and answer-word must be the same part of speech. For example, if the question-word is in the passive, the answer should be in the passive. Similarly, if the question-word is in the past tense, the answer should be in the past tense, and so on.
2. A favourite trick of the examiner is to include antonym in answer choices for an antonym. Be careful about what is asked before answering a question.
3. Don't fumble if you don't get the dictionary meaning. You are only expected to choose the word, which has most nearly the same meaning.
4. Don't ponder over a question for too long. It is better to answer first those questions you know. Then come back to those that you don't.
5. It may be possible to choose the correct answer by rejecting those words that simply cannot be the proper choice. This is done by a process of reasoning and elimination. However, you are advised to use this process only when you are not certain of the answer. *Remember that this process is very time consuming.*

11. **NEGLECTED:**
(a) Defended (b) **Attended✓**
(c) Ignored (d) None of these

12. **ACCOST:**
(a) Avoid✓ (b) Hate
(c) Accompany (d) Cajole

13. **RECEDE:**
(a) Proceed✓ (b) Reject
(c) Follow (d) Welcome

14. **CLEAN:**
(a) Pure **(b) Dirty✓**
(c) Lure (d) None of these

15. **POSTPONE:**
(a) Schedule (b) Defer
(c) Accelerate✓ (d) None of these

16. **DEPART:**
(a) Depend **(b) Come back✓**
(c) Unknown (d) Leave

17. **WAR:**
(a) Bomb (b) Calm
(c) Battle **(d) Peace✓**

18. **MASTER:**
(a) Clan **(b) Slave✓**
(c) Plain (d) Maestro

19. **The army had <u>adequate</u> ammunition for the battle.**
(a) Insufficient✓ (b) Poor
(c) Meager (d) Deficient

20. **Naila was filled with <u>remorse</u> for having refused to sell her bicycle to Saira.**
(a) Happiness **(b) Satisfaction✓**
(c) Pride (d) Happiness

21. **The budget was presented with a <u>deficit</u> of crores of rupees.**
(a) Bonus (b) Profit
(c) Surplus✓ (d) None of these

22. **His style of writing is quite <u>verbose</u>.**
(a) Short **(b) Precise✓**
(c) Limited (d) Constricted

23. **The team felt <u>triumphant</u>.**
(a) Lost (b) Sad
(c) Defeated✓ (d) None of these

24. **She had nothing but <u>scorn</u> for my ideas.**
(a) Admiration✓ (b) Agreement
(c) Encouragement (d) Appreciation

25. **He directed a couple of <u>mediocre</u> films.**
(a) Successful (b) Famous
(c) Outstanding✓ (d) Noble

26. **It was a <u>revolting</u> sight.**
(a) Remarkable **(b) Pleasant✓**
(c) Attractive (d) None of these

27. **There is something <u>repulsive</u> about the way he handles people's complaints.**
(a) Distinctive (b) Lovely
(c) Attractive✓ (d) Distinctive

28. **The witness <u>corroborated</u> word for word the statement of the victim,**
(a) Accepted **(b) Denied✓**
(c) Confirmed (d) None of these

29. **Unlike his sister, he is <u>affable</u>.**
(a) Gullible (b) Lovable
(c) Irritable✓ (d) Reserved

30. **The birth of his son decidedly proved to be an <u>auspicious</u> event in his life.**
(a) Precious **(b) Ominous✓**
(c) Useless (d) None of these

31. **It was indeed <u>arduous</u> to cross streets in Tokyo.**

(a) Painless (b) Effortless
(c) **Pleasant✓** (d) Interesting

32. **My first speech was a fiasco.**
(a) **Success✓** (b) Joy
(c) Disaster (d) Fun

33. **At first, she was reluctant to accept the appointment in the bank.**
(a) Pleased (b) Excited
(c) Anxious (d) **Willing✓**

34. **Her knowledge of Urdu appears to be quite superficial.**
(a) Perfect (b) Praiseworthy
(c) **Deep✓** (d) Sufficient

35. **She appears to be a phoney person.**
(a) Beautiful (b) Unnatural
(c) **Genuine✓** (d) Unreal

36. **When Akram entered the room, he was in a jubilant mood.**
(a) Penitent (b) Serious
(c) Defeated (d) **Depressed✓**

37. **His speeches were insipid.**
(a) Informative (b) **Lively✓**
(c) Shocking (d) Insightful

38. **They have tried their best to provoke the flood victims.**
(a) Convince (b) Gratify
(c) **Pacify✓** (d) Attract

39. **The judge implicated the investigating officer in the murder.**
(a) Liberated (b) **Exonerated✓**
(c) Absolved (d) Explicated

40. **His comment was considered pointless by the Chairman of the meeting.**
(a) **Significant✓** (b) Impartial
(c) Objective (d) Lively

41. **The rainfall was plentiful in this part during the last season.**
(a) Small (b) Rare
(c) Handful (d) **Scanty✓**

42. **I have vague memories of my childhood.**
(a) Profound (b) Sufficient
(c) Pleasant (d) **Clear✓**

43. **It was a very dreary day.**
(a) Dangerous (b) Drab
(c) Beautiful (d) **Bright✓**

44. **That man is known for his elegance.**
(a) **Awkwardness✓** (b) Savagery
(c) Clumsiness (d) Indelicacy

45. **The decision was delayed because of him.**
(a) **Expedited✓** (b) Triggered
(c) Released (d) None of these

46. **The room was filled with a delicious odour.**
(a) Strange (b) Bitter
(c) Repulsive (d) **Unpalatable✓**

47. **Silence is this place is mandatory.**
(a) **Optional✓** (b) Irritating
(c) Imperative (d) Compulsory

48. **The veracity of this statement needs to be tested further.**
(a) Pretence (b) Treachery
(c) Dishonesty (d) **Falsity✓**

49. **His radical views made him unpopular.**
(a) **Conservative✓** (b) Outmoded
(c) Narrow (d) Childish

50. **On the face of it, Iqbal's glance conveyed humorous impatience.**
(a) Dismayed (b) Disappointed
(c) Dejected (d) **Pathetic✓**

51. **Her modesty prevented her from making her feelings known to him.**
(a) Superiority (b) Arrogance
(c) **Vanity✓** (d) None of these

52. **We must realize the futility of wars.**
(a) Urgency (b) **Usefulness✓**

(c) Value (d) None of these

53. SAGE:
(a) Rogue (b) Egoist
(c) Fool✓ (d) Snob

54. MOIST:
(a) Parched (b) Hard
(c) Dry✓ (d) Crisp

55. MASK:
(a) Hit (b) Expose✓
(c) Deface (d) Injure

56. CALLOUS:
(a) Sentimental (b) Sensitive✓
(c) Confidence (d) Capable

57. BEGUILE:
(a) Cheat (b) Smile
(c) Flatter (d) Persuade✓

58. VIRTUE:
(a) Vice✓ (b) Wickedness
(c) Crime (d) Fraud

59. VENERATE:
(a) Criticize (b) Abuse✓
(c) Accuse (d) Defame

60. SHALLOW:
(a) Deep✓ (b) Hidden
(c) High (d) Hollow

61. REWARD:
(a) Forfeiture (b) Penalty✓
(c) Demotion (d) Retribution

62. FOREIGNER:
(a) Alien (b) Native✓
(c) Stranger (d) National

63. GATHER:
(a) Separate (b) Scatter✓
(c) Suspend (d) None of these

64. CONCEALED:
(a) Opened (b) Disclosed✓
(c) Released (d) Publicized

65. INNOCENT:
(a) Guilty✓ (b) Corrupt
(c) Sinful (d) Deadly

66. JUBILANT:
(a) Quiet (b) Disturbed
(c) Gloomy✓ (d) Scared

67. RESERVED:
(a) Popular (b) Likeable
(c) Talkative✓ (d) None of these

68. OFTEN:
(a) Quickly (b) Never
(c) Never (d) Sometimes✓

69. VICTORY:
(a) Fortune (b) Success
(c) Defeat✓ (d) Progress

70. LOOSE:
(a) Excellent (b) Joined
(c) Tight✓ (d) None of these

71. ACCORD:
(a) Difference (b) Agreement
(c) Failure (d) Disagreement✓

72. REJECT:
(a) Allow (b) Agree
(c) Refuse (d) Accept✓

73. He has the habit of magnifying other mistakes.
(a) Enlarging (b) Discriminating
(c) Reducing✓ (d) Denying

74. He has a definite idea of what he wants in life.
(a) Coward (b) Debtor
(c) Vague✓ (d) Deficit

75. As a novelist, Abdullah Hussain based his narrative on facts.
(a) Darkness (b) Fiction✓
(c) Story (d) None of these

76. The boss works in this office in a hostile environment.
(a) Friendly✓ (b) Malicious

(c) Doubtful (d) Cooperative

77. His principles are flexible.
(a) Strong (b) Powerful
(c) Hard (d) Rigid✓

78. The president's message of congratulations gave a boost to the morale of the team.
(a) Rebuke (b) Obstruction
(c) Discouragement✓ (d) Hinder

79. LOUDER:
(a) Noisy (b) Softer✓
(c) Smaller (d) Little

80. LOW:
(a) Below (b) Above
(c) Down (d) High✓

81. ANSWER:
(a) Reply (b) Question✓
(c) Interrogation (d) Return

82. PUNISH:
(a) Sympathy✓ (b) Help
(c) Cruel (d) Pity

83. This is not ideology but pragmatic language teaching.
(a) Improper (b) Imperfect
(c) Impossible (d) Impractical✓

84. There are reports that many poor people abandon female children.
(a) Reject (b) Keep✓
(c) Help (d) Like

85. Earthquakes are frequent in Japan.
(a) Rare✓ (b) Unusual
(c) Few (d) Extinct

86. Machine civilization has made human life artificial.
(a) True (b) Genuine✓
(c) Natural (d) Authentic

87. The Minister is optimistic about the new project just launched.
(a) Stoical (b) Pessimistic✓
(c) Cynical (d) Dubious

88. All the runners started simultaneously.
(a) Fully (b) Frequently
(c) Separately✓ (d) Momentarily

89. He was acquitted of the charge of theft.
(a) Dissociated (b) Convicted✓
(c) Exonerated (d) Released

90. The police tried to find out the rightful owner of the ornaments left in the train.
(a) Indefinite (b) Unlawful✓
(c) Claimant (d) Mistaken

91. The students assembled in the meeting hall.
(a) Eliminated (b) Diffused
(c) Dispersed✓ (d) Removed

92. The children are playing in the nearby park.
(a) Different (b) Separate
(c) Close (d) Distant✓

93. Life in the villages is very dull.
(a) Pleasant✓ (b) Bluffing
(c) Wasteful (d) Serious

94. GUILTY:
(a) Right (b) Correct
(c) True (d) Innocent✓

95. DESTROY:
(a) Invest (b) Ignorant
(c) Create✓ (d) Make

96. VIGILANT:
(a) Careless✓ (b) Irresponsible
(c) Ignorant (d) Innocent

97. GLORIOUS:
(a) Painful (b) Sad
(c) Cowardly (d) Humiliating✓

98. CANDID:
(a) Rude (b) Deceptive✓
(c) Vague (d) Cunning

99. ANCIENT:
(a) Contemporary (b) Modern✓

(c) New (d) Fresh

100. **MISERLY:**
(a) **Extravagant✓** (b) Generous
(c) Philanthropic (d) Hospitable

101. **LAMENT:**
(a) **Rejoice✓** (b) Smile
(c) Laugh (d) Enjoy

102. **OBVIOUS:**
(a) **Obscure✓** (b) False
(c) Uncertain (d) Difficult

103. **DECEIT:**
(a) Sincerity (b) Simplicity
(c) Gentility (d) **Honesty✓**

104. **The language of songs is universal.**
(a) International (b) Worldly
(c) Common (d) **Ordinary✓**

105. **My father was in fury when he heard of my failure in the examination.**
(a) Shock (b) **Joy✓**
(c) Disappointment (d) Astonishment

106. **Please confine your remarks to the topic under consideration.**
(a) Extent (b) Condense
(c) Refer (d) **Broaden✓**

107. **The inspector in the Central Excise Collectorate is assigned the renewal of certain licences.**
(a) Ordered to perform (b) Proposed to perform
(c) Allotted as part of work (d) **Requested to attend to✓**

108. **The education committee meeting was adjourned for the day.**
(a) Postponed (b) Cancelled
(c) Held (d) **Called✓**

109. **WORTHLESS:**
(a) Variable (b) **Valuable✓**
(c) Cheap (d) Invalid

110. **COARSE:**
(a) Smart (b) Attractive
(c) **Fine✓** (d) Beautiful

111. **AVENGE:**
(a) Save (b) Reward
(c) Exempt (d) **Forgive✓**

112. **TRANSPARENT:**
(a) Dense (b) **Opaque✓**
(c) Thick (d) Cloudy

113. **APPROXIMATE:**
(a) Aggregate (b) **Exact✓**
(c) Correct (d) Total

114. **CREATE:**
(a) Break (b) **Destroy✓**
(c) Distort (d) Damage

115. **HARD:**
(a) **Soft✓** (b) Smooth
(c) Durable (d) Silky

116. **BOLD:**
(a) Gentle (b) Ineffective
(c) **Meek✓** (d) Weak

117. **INDIVIDUALLY:**
(a) Wholly (b) **Collectively✓**
(c) Generally (d) Impersonally

118. **SPEND:**
(a) Prompt (b) Waste
(c) **Save✓** (d) Exhaust

119. **CONSIDERATE:**
(a) Infuriated (b) Indifferent
(c) **Harsh✓** (d) Opposed

120. **ADMONISH:**
(a) **Flatter✓** (b) Tolerate
(c) Commend (d) Approve

Explanatory Answers

1. (D): *Abate* means to make or become less. Its antonym is 'increase'.
2. (A): *Lucid* means clear. Its antonym is 'confusing'.
3. (B): *Amalgamate* means blend. Its antonym is 'segregate'.
4. (B): *Mercurial* means erratic. Its antonym is 'fastidious'.
5. (A): *Prudent* means discreet. Its antonym is 'indiscreet'.
6. (C): *Prosperity* means affluence. Its antonym is 'adversity'.
7. (C): *Derogatory* means critical. Its antonym is 'complimentary'.
8. (D): *Rueful* means full of sorrow. It antonym is 'cheerful'.
9. (C): *Enthusiastically* means with zeal. Its antonym is 'indifferently'.
10. (A): *Graphic* means detailed. Its antonym is 'vague'.
11. (B): *Neglected* means ignored. Its antonym is 'attended'.
12. (A): *Accost* means address. Its antonym is 'avoid'.
13. (A): *Recede* means go back. Its antonym is 'proceed'.
14. (B): *Clean* means free from impurities. Its antonym is 'dirty'.
15. (C): *Postpone* means to arrange something at a later time. Its antonym is 'accelerate'.
16. (B): *Depart* means to go away or leave. Its antonym is 'come back'.
17. (D): *Peace* is the antonym of 'War'.
18. (B): *Master* means who has others working for him or under him. Its antonym is 'slave'.
19. (A): *Adequate* means sufficient. Its antonym is 'insufficient'.
20. (B): *Remorse* means guilt. Its antonym is 'satisfaction'.
21. (C): *Deficit* means shortfall. Its antonym is 'surplus'.
22. (B): *Verbose* means bombastic. Its antonym is 'precise'.
23. (C): *Triumphant* means victorious. Its antonym is 'defeated'.
24. (A): *Scorn* means strong contempt. Its antonym is 'admiration'.
25. (C): *Mediocre* means not very good. Its antonym is 'outstanding'.
26. (B): *Revolting* means causing disgust or horror. Its antonym is 'pleasant'.
27. (C): *Repulsive* means causing a feeling of loathing or aversion. Its antonym is 'attractive'.
28. (B): *Corroborated* means confirmed. Its antonym is 'denied'.
29. (C): *Affable* means lovable. Its antonym is 'irritable'.
30. (B): *Auspicious* means of good omen. Its antonym is 'ominous'.
31. (C): *Arduous* means tiring. Its antonym is 'pleasant'.
32. (A): *Fiasco* means disaster. Its antonym is 'success'.
33. (D): *Reluctant* means hesitant. Its antonym is 'willing'.
34. (C): *Superficial* means shallow. Its antonym is 'deep'.
35. (C): *Phoney* means unnatural or unreal. Its antonym is 'genuine'.
36. (D): *Jubilant* means happy. Its antonym is 'depressed'.
37. (B): *Insipid* means lacking interest. Its antonym is 'lively'.
38. (C): *Provoke* means inflame. Its antonym is 'pacify'.
39. (B): *Implicated* means involved. Its antonym is 'exonerated'.
40. (A): *Pointless* means insignificant. Its antonym is 'significant'.

41. (D): *Plentiful* means more than enough. Its antonym is 'scanty'.
42. (D): *Vague* means not precise. Its antonym is 'clear'.
43. (D): *Dreary* means dull or drab. Its antonym is 'bright'.
44. (A): *Elegance* means grace. Its antonym is 'awkwardness'.
45. (A): *Delayed* means postponed. Its antonym is 'expedited'.
46. (D): *Delicious* means tasty. Its antonym is 'unpalatable'.
47. (A): *Mandatory* means imperative or compulsory. Its antonym is 'optional'.
48. (D): *Veracity* means truthfulness. Its antonym is 'falsity'.
49. (A): *Radical* means reactionary. Its antonym is 'conservative'.
50. (D): *Humorous* means funny. Its antonym is 'pathetic'.
51. (C): *Modesty* means humility. Its antonym is 'vanity'.
52. (B): *Futility* means uselessness. Its antonym is 'usefulness'.
53. (C): *Sage* means wise. Its antonym is 'fool'.
54. (C): *Moist* means damp. Its antonym is 'dry'.
55. (B): *Mask* means covering for face. Its antonym is 'expose'.
56. (B): *Callous* means careless. Its antonym is 'sensitive'.
57. (D): Beguile means cheat. Its antonym is 'persuade'.
58. (B): *Virtue* means goodness. Its antonym is 'vice'.
59. (B): *Venerate* means respect. Its antonym is 'abuse'.
60. (A): *Shallow* means not deep. Its antonym is 'deep'.
61. (B): *Reward* means a sum of money offered. Its antonym is 'penalty'.
62. (B): *Foreigner* means resident of some other country. Its antonym is 'native'.
63. (B): *Gather* means collect. Its antonym is 'scatter'.
64. (B): *Concealed* means hidden. Its antonym is 'disclosed'.
65. (A): *Innocent* means guiltless. Its antonym is 'guilty'.
66. (C): *Jubilant* means jolly. Its antonym is 'gloomy'.
67. (C): *Reserved* means not showing feelings. Its antonym is 'talkative'.
68. (D): *Often* means frequently. Its antonym is 'sometimes'.
69. (C): *Victory* means success. Its antonym is 'defeat'.
70. (C): *Loose* means not tight. Its antonym is 'tight'.
71. (D): *Accord* means agreement. Its antonym is 'disagreement'.
72. (D): *Reject* means discard. Its antonym is 'accept'.
73. (C): *Magnifying* means exaggerating. The antonym is 'reducing'.
74. (C): *Definite* means firm. The antonym is 'vague'.
75. (B): *Facts* means reality. Its antonym is 'fiction'.
76. (A): *Hostile* means inimical. Its antonym is 'friendly'.
77. (D): *Flexible* means easy going. Its antonym is 'rigid'.
78. (C): *Boost* means encouragement. Its antonym is 'discouragement'.
79. (B): *Louder* means at a higher pitch. Its antonym is 'softer'.
80. (D): *Low* means below. Its antonym is 'high'.
81. (B): *Answer* means to reply. It anotnym is 'question'.
82. (D): *Punish* means to award punishment. Its antonym is 'sympathy'.
83. (D): *Pragmatic* means practical. Its antonym is 'impractical'.

84. (B): *Abandon* means to leave or forsake. Its antonym is 'keep'.
85. (A): *Frequent* means common. Its antonym is 'rare'.
86. (C): *Artificial* means synthetic. Its antonym is 'genuine'.
87. (B): *Optimistic* means full of hope. Its antonym is 'pessimistic'.
88. (C): *Simultaneously* means at the same time. Its antonym is 'separately'.
89. (B): *Acquitted* means released. Its antonym is 'convicted'.
90. (B): *Rightful* means lawful. Its antonym is 'unlawful'.
91. (C): *Assembled* means gathered. Its antonym is 'dispersed'.
92. (D): *Nearby* means close. Its antonym is 'distant'.
93. (A): *Dull* means listless. Its antonym is 'pleasant.'
94. (D): *Guilty* means accused. Its antonym is 'innocent'.
95. (C): *Destroy* means to kill. Its antonym is 'create'.
96. (A): *Vigilant* means to careful. Its antonym is 'careless'.
97. (D): *Glorious* means full of honour. Its antonym is 'humiliating'.
98. (B): *Candid* means frank and unambiguous. Its antonym is 'deceptive'.
99. (B): *Ancient* means old. Its antonym is 'modern'.
100. (A): *Miserly* means stingy. Its antonym is 'extravagant'.
101. (A): *Lament* means to feel sorry for. Its antonym is 'rejoice'.
102. (A): *Obvious* means clear. Its antonym is 'obscure'.
103. (D): *Deceit* means cheating. Its antonym is 'honesty'.
104. (D): *Universal* means understood by everyone in the world. Its antonym is 'ordinary'.
105. (B): *Fury* means violent temper. Its antonym is 'joy'.
106. (D): *Confine* means to limit. Its antonym is 'broaden'.
107. (D): *Assigned* means given. Its antonym is 'requested to attend to'.
108. (D): Adjourned means put off. Its antonym is 'called'.
109. (B): *Worthless* means useless. Its antonym is 'valuable'.
110. (C): *Coarse* means rough. Its antonym is 'fine'.
111. (D): *Avenge* means take revenge for. Its antonym is 'forgive'.
112. (B): *Transparent* means letting light pass without distortion. Its antonym is 'opaque'.
113. (B): *Approximate* means very near. Its antonym is 'exact'.
114. (B): *Create* means to make. Its antonym is to 'destroy'.
115. (A): *Hard* means firm. Its antonym is 'soft'.
116. (C): *Bold* means daring. Its antonym is 'meek'.
117. (B): *Individually* means relating to a single person. Its antonym is 'collectively'.
118. (C): *Spend* means disburse. Its antonym is 'save'.
119. (C): *Considerate* means kind. Its antonym is 'harsh'.
120. (A): *Admonish* means to rebuke or chide. Its antonym is 'flatter'.

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A3 Sentence Completion

|06 MCQs|

Strategies for the Sentence Completion Section:

The Sentence Completion section of the Verbal Test is most obviously designed to measure your knowledge of college-level vocabulary. Although vocabulary building books are available, the best way to develop a good working vocabulary is to read. Reading a variety of authors in a variety of genres will help yourdevelop not only a good vocabulary but will help you understand the structure of sentences, which in turn will help you comprehend not only what you are reading, but the subtleties hidden to surface readers. Obviously, the more widely read you are, the better you will score on the Verbal Test. Notwithstanding, some clues will help unprove your scores when you learn to identify them and how to use them to your advantage. Clues and techniques specifically designed for the Sentence Completion portion will be presented throughout this section and in the answers and explanations sections.

This section tests your ability to understand the composition of a sentence and select the correct word or two words that best complete and

STEPS FOR SOLVING

Sentence Completion Questions

Follow the following steps to solve the sentence completion questions:

1. First of all, read the entire sentence carefully. This will help you to understand the meaning of the given sentence.
2. Before looking at the choices, think of the missing word or words you would insert.
3. Think of word or words that make sense and look for synonyms of them.
4. Look for signal words like although, however, despite, rather than, but, etc, that connect contrasting ideas.
5. Look for signal words like and, in other words, and therefore that often connect similar ideas or lead to definitions of missing words.
6. Watch the contrast between positive, negative and neutral words.
7. Negative words can change the direction of the sentence, sometimes making the logic of the sentence difficult to follow.
8. Now look at all the possible answers before you make your final choice.
9. If a choice matches your guess, mark it and move on.
10. If you do not find your guess there, test the choices to find the one that works best.
11. Questions with two words missing should be attempted one word at a time.
12. Sometimes the first blank works but sometimes it is more efficient to work from the second blank first.
13. If you are stumped, quick read and plug each answer choice into the blank and which sounds best, mark it.
14. In the end, always read your answer into the sentence to make sure that it makes sense.
15. Use your knowledge and experience of word parts and parts of speech to seek the meanings of unfamiliar words.

complement the overall meaning of the sentence, while retaining the structure and style. Although the sentences generally will be about familiar topics, you need not necessarily know the definitions of all words to correctly answer these questions. In some ways, this section is a warm up, if you will, to the reading passage questions. The Sentence Completion section will front-load your brain with a variety of sentence structures and styles you may well see in the Reading Comprehension sections. The College Board tells us that instructions for the Sentence Completion section of the Verbal Test will be something like the following: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five words or sets of words labelled A through E. Choose the word or set of words that, when inserted in the sentence, *best* fits the meaning of the sentence as a whole. Before looking at a sample set of questions, let's make sure that we understand the instructions. By asking that we choose the word or set of words that "best" fit the meaning of the sentence, we are being warned that there may be more than one word or set of words that actually fit the meaning of the sentence. In other words, do not select the first word or set of words that make sense when inserted into the sentence. Rather, read all answer choices, marking out the ones that do not fit, and then select the one that *best* fits the meaning of the sentence "as a whole." Although this may seem rather rudimentary, the subtleties of tone, mood, and direction within word choices will test the skills of every individual taking the test. Being familiar with these instructions will help you save time on the day of testing. Remember, your focus is to score as many correct answers as possible. Using the following strategies will help you save time, thereby providing you with the opportunity to answer more questions correctly.

HOW TO ANSWER SENTENCE COMPLETION QUESTIONS

1. Read the sentence carefully. Try to understand what it means.
2. Consider the blank or blanks with relation to the meaning of the sentence. Is a negative connotation called for or a positive one? If there are two blanks, should the pair be comparative, contrasting, or complementary? Are you looking for a term that best defines a phrase in the sentence?
3. Eliminate those answer choices that do not meet the criteria you established in step two.
4. Read the sentence to yourself, trying out each of the choices, one by one. Which choice is the most exact, appropriate, or likely considering the information given in the sentence? Which of the choices does the best job of completing the sentence?
5. First answer the questions you find easy. If you have trouble with a question, leave it and go back to it later. If a fresh look does not help you to come up with a sure answer, make an educated guess.

Context-Based Questions

The Verbal Test Sentence Completion section can be broken down into two basic subsets: questions using vocabulary in context and questions that are logic-based. Although knowing the definition of the words in the answer choices gives you a better chance of selecting the correct answer, knowing how the words are used in the context of the sentence will help with in-context questions. This subset includes both one-blank and two-blank

questions.

1. **Male and female loons tend to act ___, actively helping each other forage for food to feed their young.**

A. aggressively B. surreptitiously C. cooperatively
D. defensively E. erratically

The correct choice is C.

Explanation: The sentence question is actually asking how loons behave. The missing word is further defined after the comma and suggests that loons are seen "actively helping each other forage for food to feed their young." Only one word among the choices describes this behavior: *cooperatively.*

2. **My grandmother, who never spent a dime and rarely talked, was considered both _____ and _____.**

A. miserly. . . taciturn B. frugal. . . effusive
C. stingy. . . garrulous D. thrifty. . . raucous
E. munificent. . . reticent

The correct choice is A.

Explanation: Quite simply, you are to find the two words that describe my grandmother. One of the words must mean that she did not spend money willingly, and the other must mean that she did not talk much. The correct answer is "miserly. . . taciturn." Miserly means like a miser or extremely stingy, and taciturn means shy or unwilling to engage in conversation. Note that Choices A through D might meet the first blank criteria of not spending money easily, but only Choices A and E meet the criteria for being silent. As answer Choice A is the only choice meeting the demands of both context-based definitions, it is the correct answer.

Logic-Based Questions

Logic-based questions require you to know the meanings of the words, how the words are used in context, and understand the logical flow of the sentence. This subset also includes both one-blank and two-blank questions.

1. **After witnessing a number of territorial skirmishes, Dr. Jarmen had to change his earlier opinion that these particular breeds of chipmunk were always _____ animals.**

A. curious B. harsh C. quarreling
D. peaceful E. warring

The correct choice is D.

Explanation: Following the logical flow of the sentence will help alleviate incorrect answer choices. First, the introductory word "After" informs the reader that the information at the beginning of the sentence is going to impact what comes later in the thought or logical process. The word "change" informs the reader that there is a different thought or reaction

than that previously described in the sentence. Events described in the beginning of the sentence are seen as the catalyst for the change, whatever it might be. Finally, the logic of the flow of ideas tells the reader what is changing, ". . . his earlier opinion that these particular breeds of chipmunk were always _____animals." The word that best fits the blank necessarily should convey a meaning of revision after seeing the animals fighting. Answer Choice D, peaceful, is the only plausible selection.

2. **Although teasers for the film were absolutely _____, the film itself was well presented, well timed, and represented a rather _____work.**

A. scintillating. . . blasé
B. tasteless. . . amateur
C. risqué. . . bawdy
D. breathtaking. . . familiar
E. crude. . . polished

The correct choice is E.

Explanation: The introductory word "Although" in the first clause informs the reader that the tone in the second clause will be dichotomous to the first. This means that we are looking for basic antonyms in our correct choice. Answer Choices A, D, and E all qualify for a difference in tone. Additionally, however, the second word must complement the tone of well presented and well timed. In this case, looking at the second word choice actually leaves us with the only correct choice, E.

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SENTENCE COMPLETION REVIEW QUESTIONS

Sentence Completion Skill Set One:

Note: Unlike the actual Verbal Test, these questions are not arranged from easiest to hardest.

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five words or sets of words labelled A through E. Choose the word or set of words that, when inserted in the sentence, *best* fits the meaning of the sentence as a whole.

1. **Football players, generally known for their elevated testosterone levels, would see crying as _____unmanly rather than a humanistic trait _____ by either sex.**

A. sickeningly. . . thwarted
B. inherently. . . experienced✓
C. inexplicably. . . enjoyed
D. intentionally. . . fostered
E. plausibly. . . envisioned

2. **Despite the fact that Frank Lloyd Wright communities are almost ___, they leave behind a _____legacy of architecture and furniture design.**

A. obsolete. . . transitory
B. dormant. . . modest
C. extinct. . . vital✓
D. self-sufficient. . . prodigious
E. isolated. . . robust

3. **The majority of the villagers in this seemingly forgotten land, are_____**

vegetarians; that is, they only eat meat during a holy celebration, or whenever they can afford it, which, because of the ludicrously high prices, is practically never.

A. sometimes B. clandestine E. reluctant✓
C. staunch D. adamant

4. The ___lecture hall could seat the entire graduating class including guests; some said it was even _____.

A. burgeoning. . . elaborate B. bodacious. . . monumental
C. elaborate. . . haughty D. commodious. . . enormous✓
E. capacious. . . miniscule

5. The secretary _agreed to ____the president's decision, knowing that the information was less than factual and against her basic beliefs regarding deceptive sales practices.

A. grudgingly. . . abide by✓ B. willingly. . . support
C. secretively. . . acknowledge D. maliciously. . . sway
E. furtively. . . foster

6. Either the fishing at Redington Beach is _____, or I went there on an off day.

A. plentiful B. overrated✓
C. caustic D. sporadic E. invigorating

7. His _____remarks really detracted from the overall speech; he should not have so readily strayed from his subject.

A. repugnant B. digressive✓
C. redundant D. innocuous E. enigmatic

8. He acted with great ___, as if he were a diplomat without regard for crimination.

A. emotion B. restraint
C. concern D. statesmanship E. disdain✓

9. As I was describing my encounter with the alien, he had the most ____stare, as if he didn't believe a word I was saying.

A. amazing B. dumbfounded
C. incredulous✓ D. blank E. obdurate

10. The ___of horns heard while gridlocked at the traffic jam was as discordant as an untamed orchestral performance.

A. blaring B. harmonic
C. sequencing D. cacophony E. syncopated

Answers and Explanations for Skill Set One:

1. The correct choice is B.

Explanation: Although Choice A, "sickeningly" may work in the first blank, to prevent an occurrence, or thwart, an action does not fit the second. Choice C, "inexplicably," might also fit the first blank, but crying is not typically something the testosterone-laden player would enjoy. Choices D and E, "intentionally" and "plausibly" don't fit the first blank and may be

eliminated. This leaves Choice B, "inherently," or essentially or intrinsically unmanly rather than a trait "experienced" by either sex.

2. The correct choice is **C**.

Explanation: The word "Despite" is the clue word in this sentence. It indicates that there is a contrast between the two parts of the sentence. The pair of words should necessarily be dichotomous or nearly opposites. As Choice C is the only pair with such a relationship, it should be the obvious answer.

3. The correct choice is **E**.

Explanation: The phrase that is the clue here is "that is." This phrase tells you that there is an explanation coming to reason what has been previously stated. In this case, we know that the majority of the villagers are vegetarians and that what is about to follow will help explain or give reason for that fact. We are then told that the primary reason they are vegetarians is that meat is very high priced, and they are poor so they can afford to eat meat only infrequently. Choice A suggests that they chose at will whether to be abstaining from meat as "sometimes" indicates a selection process controlled by the selector rather than conditions outside their control. Choices C and D, "staunch" and "adamant" indicate a choice of determination to be vegetarian. We are told, however, that they eat meat when they can afford to buy it or for ceremonial purposes. Choice B, "clandestine" indicates a secretive vegetarianism and since we know they eat meat during holy celebrations, this choice cannot be true. This leaves choice E, "reluctant," as they eat meat during holy celebrations or "whenever" they can afford it.

4. The correct choice is **D**.

Explanation: The clue given in this sentence is that the lecture hall is dealing with the volume of people it can contain. Further, the second blank must indicate a degree of increase of the first blank and be synonymous with it. Choice E is an antonym and, therefore, excluded. Although Choice B seems plausible, "bodacious" means something notable. Although "monumental" would seem to represent a degree of increase from notable, this is not the "best" selection to describe the size of the hall. Choices A and C both represent a degree of design or architecture rather than size and may be disqualified. Choice D, "commodious" and "enormous," indicate suitable capacity and the ability to hold a large quantity.

5. The correct choice is **A**.

Explanation: Choices B and E include "foster" and "support," which cannot apply as the clue regarding a conflict between the decision and the secretary's basic beliefs are incongruent. Choice C is effectively impossible as one cannot secretively acknowledge. Choice D suggests the secretary would do something malicious, which is at odds with her character and morals indicated in the sentence. Choice A satisfies the condition of how she would go along with the decision, "grudgingly."

6. The correct choice is **B**.

Explanation: As catching a lot of fish is generally the purpose of going fishing, the sentence would indicate that this was not the case on the day in question. Therefore, we are looking for a word choice that indicates some explanation for not catching fish. Answer Choice B,

"overrated," would indicate that while the expectation was that this location would be good fishing, something was amiss.

7. The correct choice is **B**.
Explanation: The clue here is in the phrase that states he should not have strayed from the subject of his speech. The best word is Choice B, "digressive."

8. The correct choice is **E**.
Explanation: The clue phrase here is, ". . .as if he were a diplomat without regard for crimination." This indicates that the actions needed to best fit the blank represent a disregard for the laws or rules of proper behavior. In this regard, Choice E, "disdain," best represents the actions akin to a disregard for laws or rules.

9. The correct choice is **C**.
Explanation: We are looking for a word that would indicate disbelief. We also know that we are looking for an adjective. Don't let a word like obdurate throw you. Although the listener might indeed be stubborn in his willingness to believe the story being told, the sentence clues still call for disbelief. Therefore, Choice C, "incredulous," or skeptical and showing disbelief is correct.

10. The correct choice is **D**.
Explanation: The clue phrase, ". . .was as discordant as. . ." indicates we are looking for a synonym to discordant. As Choice B, "harmonic," indicates pleasing tones musically aligned, it must be eliminated. Choices A, C, and E, "blaring," "sequencing," and "syncopated" or volume and timing have nothing to do with discordance and should likewise all be eliminated. Only answer Choice D, "cacophony," indicates discordant, displeasing sounds.

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Sentence Completion Skill Set Two:

Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five words or sets of words labelled A through E. Choose the word or set of words that, when inserted in the sentence, *best* fits the meaning of the sentence as a whole.

1. Her _____demeanor was understandable given the loss of her brother; indeed, most of us were rather _____.

A. lachyromose. . . dolorous✓ **B.** reprehensible. . . enigmatic
C. subtle. . . raucous **D.** determined. . . committed
E. displaced. . . focused

2. It was a rather _____mystery, full of twists and turns and surprises and _____most difficult to predict.

A. tawdry. . .foreshadowing **B. knotty. . .nuances✓**
C. subtle. . .characters **D.** obvious. . .reversals
E. easily understood. . .clever redirections

3. He is the _____of evil; he lies, cheats, steals, murders, and boasts of his anti-societal behavior.

A. antithesis **B.** plaintiff **C. epitome✓**
D. harbinger **E.** picture

4. It is commonly believed that statesman Frederick Douglass _____patterned his autobiography after the ___of the former slave Olaudah Equiano.
A. effectively. . . notations B. knowingly. . . diary
C. accidentally. . . writings D. intentionally. . . narrative✓
E. expectantly. . . accomplishments

5. Legislative leaders found it desirable to _____ prohibition, partially in order to recover revenue from taxation on spirits.
A. enforce B. abrogate C. stave
D. modify E. obdurate

6. It is incomprehensible that the tax codes should be such a _____instead of a straightforward bracket based on gross earnings, notwithstanding deductions.
A. farce B. joke C. labyrinth✓
D. calamity E. malfeasance

7. The editorial, in obvious opposition to the article appearing in yesterday's newspaper, was well- written, well-documented, factual, and non-confrontational, the only intent of which seemed to _____the article.
A. repudiate✓ B. contradict C. correct
D. lend credence E. show support

8. It is within the _____years that wisdom evidences itself, when those long in tooth, grayed in hair, and physically feeble demonstrate knowledge that is only paid for with the price of age.
A. latent B. dormant C. transcended
D. tenacious E. crepuscular✓

9. Now is not the time for _____decisions, but _____in our cause for freedom.
A. difficult. . . acquiescence B. peaceful. . . tenacity
C. austere. . . commitment D. tentative. . . resolution✓
E. weak. . . discourse

10. In order to _____ratings, the incumbent directed party loyalists to flood the media with _____ about recent developments in job creation.
A. bolster. . . accolades✓ B. improve. . . talk
C. explain. . . data D. nullify. . . falsehoods
E. mollify. . . rumors

Answers and Explanations for Skill Set Two:

1. The correct choice is A.

Explanation: The sentence indicates that all persons felt basically the same way as the sister suffering the loss of her brother. We must look for a synonym in order to fit both blanks. Answer Choice E, "displaced. . . focused" reflect almost opposite states and should be immediately eliminated. Although Choice D seems plausible as "determined. . . committed" appear to be synonymous, they do not best fit the mood or tone of the sentence. Answer Choice B, "reprehensible. . . enigmatic" can be eliminated because if her demeanor was in fact "reprehensible," then it would not be understandable. Answer Choice C is another

antonym leaving Choice A, "lachrymose. . . dolorous" indicating a tearful demeanor and most of us being sorrowful.

2. The correct choice is B.

Explanation: We are looking for the second blank to offer some continuation of a writing style that complements "twists and turns and surprises." Given this element, the first blank must indicate the type of mystery wherein the style would be found. As "foreshadowing" allows the reader to predict future events, Choice A could be discounted. Choice C, "characters" does not match the second blank looking for a continuation of styles and should be eliminated. Choices D and E, "reversals" and "clever redirections" look plausible, and we must look at the first blank to further determine viability. An "obvious" mystery or an "easily understood" mystery do not attend to twists, turns, and surprises and can be stricken. This leaves Choice B, "knotty. . . nuances." Knotty means complex or difficult to solve and, indeed, this matches the styles having twists, turns, and surprises. The complement to these styles is "nuances" or subtleties that are difficult to predict.

3. The correct choice is C.

Explanation: As the examples represent what is believed to be the societal reflection of evil, then we are looking for a word that suggests he represents that classical example. Answer Choice C, "epitome" correctly indicates that he is the representative example of evil, given his actions.

4. The correct choice is D.

Explanation: If, in fact, Douglass did pattern his autobiography after something, it would likely be another form of literature lending itself to this endeavor. Choices A, B, and E, "notations" "diary" and "accomplishments" do not lend themselves readily to be patterned as an autobiography. Choices C and D, "writings" and "narrative" appear plausible so we must look at the first blank to finalize our choice. As Choice C is most unlikely in that Douglass would "accidentally" pattern his autobiography after another leaving choice D, "intentionally. . . narrative."

5. The correct choice is B.

Explanation: Answer Choice A, "enforce" would only serve to keep revenues from being collected. Choice C, "stave" would only serve to alter prohibition or put it off, which does not match as this was a recovery of revenue that could happen only if the revenue was lost by prohibition already having been enacted. Choice D, "modify" would serve only to change but not necessarily recoup revenues. Choice E, "obdurate" is to confuse intentionally and that would not return the revenues. This leaves Choice B, "abrogate" or repeal prohibition, which would allow the sale and collection of revenue from that sale of spirits.

6. The correct choice is C.

Explanation: Although many believe the tax codes are a farce or joke, there seems to be nothing funny about filing taxes and figuring out the rules. Likewise, the tax code may be believed by many to be malfeasance on the part of those who wrote the code, but we are looking for a word that better align with incomprehensible in the structure of the code. Although many believe the code to be disastrous, it has nothing to do with nature. This leaves Choice C, "labyrinth" which best describes the complexities that could be better understood with a simple bracket flat tax.

7. The correct choice is A.

Explanation: The partial phrase, ". . . in obvious opposition to the article," alleviates Choices D and E automatically. Choices B and C certainly seem plausible but remember that the Verbal Test reviewers want the "best" answer. As the writer of the editorial in opposition provided facts and was well documented, the writer was clearly trying to reject the original article as unfounded, ergo choice A.

8. The correct choice is **E.**

Explanation: Here is where the College Board is looking for you to be able to determine the tone and flow of a sentence. This cannot be accomplished by surface reading and is likely not to be within the grasp of someone who is not well read. Remember, the best preparation is to read and read a lot. Read different authors, different genres, written at different periods to best understand how the tone, pace, and flow of a sentence will assist you in determining the best answer choice. Choices A and B, "latent" and "dormant" indicate inaction while the sentence clearly states that there is an evidencing of this knowledge occurring. Choice C, "transcended" has the wrong tense as these years have passed and those with wisdom cannot be currently evidencing knowledge if the years are past. Choice D, "tenacious," is clearly the wrong tone for the sentence. We aren't talking about the leathery skin of the elderly, but rather the time before the setting sun of life wherein those who have experienced life to the fullest may share knowledge that is yet a mystery to younger generations. Choice E, "crepuscular" retains the mood of an evening, or the sun setting on a long life.

9. The correct choice is **D.**

Explanation: The key word clue here is "but," which announces a change in direction. We need to look for opposites to match this pair of blanks. Although Choice A meets the criteria, they appear to be opposite of what would be expected in the cause of freedom. Choice B, "peaceful" does not lend itself to decisions. Choice C does not offer enough opposition in terms. Choice E, "weak. . . discourse" individually fit within each clause but does not complement both clauses in the sentence. Choice D, "tentative. . . resolution" is the only pair offering both sufficient opposition and complement to both clauses.

10. The correct choice is **A.**

Explanation: Now is the time for a little common knowledge. Any time a politician and ratings are involved, you simply need to understand that an incumbent wants the best ratings possible. This means that when something good does happen, it is the responsibility of those with vested interests to make sure that the most positive spin possible gets into the media. In this regard, only Choices A and B, "bolster" and "improve" speak to desired ratings. We need to look at the second blank to complete the best selection. Between "accolades" and "talk" clearly, the term "accolades" puts a more positive spin on the accomplishments. Therefore, Choice A is correct.

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Expected Questions for Coming Exams.

Sentence Completion with Grammatical Words

☞ Each question contains incomplete sentence. Below each sentence are four grammatical words or phrases mark A, B, C, and D. You are to choose the one grammatical word or phrase that best completes the sentence.

1. **Truth or Love in grammar is_____:**
   (A) Noun (B) Verb
   (C) **Asbstract noun✓** (D) Concrete

2. **Who, which or what are_____:**
   (A) Relative Pronouns (B) **Interrogative pronouns✓**
   (C) Indefinite pronouns (D) Reciprocal pronouns

3. **A word that expresses an action, an occurrence or a state of being is called_____:**
   (A) Noun (B) **Verb✓**
   (C) Pronoun (D) Adjective

4. **Friday prayer is _____adjective.**
   (A) Descriptive (B) **Proper✓**
   (C) Limiting (D) Article

5. **_____is an indefinite Pronoun.**
   (A) My self (B) This book
   (C) **Every one✓** (D) Who

6. **_____ is a Relative Pronoun?**
   (A) My self (B) This book
   (C) Every one (D) **Who✓**
   (E) None of these

7. **"Mr. Aslam has telephoned his son once a week for years" is a ____ tense.**
   (A) **Present prefect✓** (B) Present
   (C) Past (D) Future
   (E) None of these

8. **"Mr. Aslam talks to his son on the telephone daily" is a ____ tense.**
   (A) Present perfect (B) **Present✓**
   (C) Past (D) Past perfect
   (E) None of these

9. **Objectives limiting the meaning of a noun showing either possession, demonstration, or number are called:**
   (A) Limiting adjective (B) Descriptive adjective
   (C) **Proper adjective✓** (D) Indicative adjective
   (E) None of these

10. **"The fool shot himself in the foot" is a ____ Pronoun.**

(A) Personal Pronoun
(B) **Reflexive Pronoun✓**
(C) Indefinite Pronoun
(D) Demonstrative Pronoun
(E) None of these

11. **The experienced judge usually does not jump ——— the conclusions.**
(A) **At✓**
(B) On
(C) For
(D) To
(E) None of these

12. **The hypocrite ——— the feelings which he does not possess but which he feels he should display.**
(A) Conceals
(B) Condones
(C) Betrays
(D) **Stimulate✓**
(E) None of these

13. **Adolf Hiler had his detractors, but his critics have had amazingly ——— success at shaking his self confidence or ——— his reputation.**
(A) Great, repairing
(B) Small, enhancing
(C) **Little, denting✓**
(D) doctors, heroism
(E) None of these

14. **Scientists and ——— tracking down germs have shown ——— in their fight against disease.**
(A) Surgeons, boldness
(B) Dentists, skill
(C) Artists, skill
(D) **Doctor, heroism✓**
(E) None of these

15. **Critics of the law and order situation, in Pakistan argue that, rather than aiding people's efforts to protect their lives, police ——— their freedom.**
(A) Seep
(B) **Suppress✓**
(C) Renew
(D) Abet
(E) None of these

16. **The politicians speech usually contains nothing but empty promises ——— and chinches.**
(A) Cadre
(B) **Platitudes✓**
(C) Nuance
(D) Threats
(E) None of these

17. **By virtue of much practice in computer, Mr. Azhar became ——— and was able to manipulate his mechanical tools with either hand.**
(A) Practical
(B) **Ambidextrous✓**
(C) Ambivalent
(D) Tricky
(E) None of these

18. **The poetess Parveen Shakar received little homour in her lifetime but has gained considerable fame:**
(A) Privately
(B) Prematurely
(C) Previously
(D) **Posthumously✓**

(E) None of these

19. Quaid□e□Azam library kept the old books, not for any ——— value they had but for purely ——— reasons.
(A) Intrinsic, sentimental
(B) Potential, monetary
(C) Financial, Pecuniary✓
(D) Personal, accidental
(E) None of these

20. Techniques for preserving and storing blood plasma for emergency use in Pakistan proved so ——— that it became ——— for the present bank blood system used by the Red Crescent.
(A) effective, model
(B) urgent, pattern
(C) innocuous, excuse✓
(D) complex, blueprint
(E) None of these

21. Because Azad saw no ——— to the task assigned to him, he worked at it in a very ——— way.
(A) end, rigid✓
(B) Point, perfunctory
(C) method, dutiful
(D) Purpose, diligent
(E) None of these

22. The fact is that pain is the body's early warning system loss of ——— in the extremities leaves a person ——— injuring him:
(A) Agony, incapable of
(B) Feeling, habituated to
(C) Sensation, vulnerable to✓
(D) Movement, prone to
(E) None of these

23. Luckily, Rehana was ——— her accomplishments probably unwilling to ——— before her friends.
(A) excited by, praise
(B) uncertain of, conceal
(C) unaware of, conceal✓
(D) deprecatory about, flaunt

24. Wooden surface was glued ——— the steel surface.
(A) With in
(B) Against✓
(C) On to
(D) In to
(E) None of these

25. ——— is a person who dabbles in art and letters.
(A) Philosopher
(B) Philistine
(C) Chauvinist
(D) Dilettante✓
(E) None of these

26. The committee censured the member, noting that his behaviour was the very ——— of ethical conduct.
(A) Essence
(B) Embodiment
(C) Nature
(D) Antithesis✓
(E) None of these

27. Stand here ——— I speak:
(A) While✓
(B) As

(C) When (D) The time
(E) None of these

28. **The tapeworm is an example of ——— organism:**
(A) **Parasitic✓** (B) Protozoan
(C) Exemplary (D) Hospitable
(E) None of these

29. **Although leprosy is not highly contagious disease, those who have contracted it have always been pariahs and ——— by others.**
(A) **Ostracized✓** (B) Accepted
(C) Sheltered (D) Admonished
(E) None of these

30. **Although the novel was generally boring and awkwardly written, there were ——— passages of power and lyricism which hinted at the author's ———:**
(A) **Occasional: Potential✓** (B) Frequent: Malevolence
(C) Static: Style (D) Ill conceived: Superficiality
(E) Contrived: ignorance

31. **Although the manager of the corporation was wrong, his stubborn refusal to ——— or even to compromise ——— an already tense situation:**
(A) Arbitrate: Thwarted (B) **Capitulate: Exacerbated✓**
(C) Censure: Rectified (D) Mandate: Violated
(E) Scrutinize: Contained

32. **Portraits painted in Pakistan are quite charming but ——— and demonstrate the isolation of Pakistani painter. They show little or no ——— of the development of painting in Asia:**
(A) Grotesque: Concern (B) Frivolous: Affirmation
(C) Deliberate: Domination (D) Sophisticated: Consideration
(E) **Primitive: knowledge✓**

33. **The design of the building was magnificent, but its classical lines seemed almost ——— and out of place in the business district which was ——— ultramodern steel and glass sky scrapers.**
(A) Garish: Beleaguered (B) **Anachronistic: Replete with✓**
(C) Untoward: Bereft of (D) Grotesque: Enhanced by
(E) Sanguine: Populated by

34. **Animal behaviorists theories that dogs are more ——— then cats because they are pack animals whereas cats, solitary hunters are more independent and ——— therefore less likely to try to please their owners.**
(A) Precocious: Complex (B) Aggressive: Obsequious
(C) **Tractable: Obdurate✓** (D) Intelligent: Resilient
(E) Formidable: Reliable

35. **The Parks Department claims there is a ———of wildlife in the New York city area, and that species which have not lived in the area for most of the century**

are once again being sighted.
(A) Resurgence✓ (B) Paucity
(C) Superstructure (D) Prototype
(E) Compendium

36. Although the jury thought the defendant had been somewhat less than ——— in his testimony, the —— summary of the defense attorney finally convinced them of her client's innocence.
(A) Interesting: Lack luster (B) Candid: Persuasive✓
(C) Convincing: Inordinate (D) Honest: Confusing
(E) Forth right: Irrational

37. The guests invited to meet the famous critic were —— by a charm which contrasted sharply with the —— of his writing:
(A) Appalled: Inadequacy (B) Frustrated: Wittiness
(C) Deceived: Elegance (D) Delighted: Venom✓
(E) Enthralled: Lucidity

38. The term Indian is a misnomer for the Native American introduced by Columbus and —— by historians.
(A) Eradicated (B) Arbitrated
(C) Infiltrated (D) Perpetuated✓
(E) Coerced

39. In his private life he was quite —— but he gave large sums of money to charities, so most people thought of him as a———.
(A) Pusillanimous: Charlatan (B) Immodest: Chauvinist
(C) Flamboyant: Savant (D) Sinister: Mercenary
(E) Miser: Philanthropist✓

40. Although Mozart's music suggests a composer of great —— and seriousness, his letters imply that he was naive and———.
(A) Erudition: Grave (B) Sophistication: uncouth✓
(C) Fortitude: Macabre (D) Levity: Sanctimonious
(E) Fragility: Pensive

41. Although he had inherited a substantial amount of money, his —— soon led to his filing for bankruptcy.
(A) Prodigality✓ (B) Volubility
(C) Tenacity (D) Fastidiousness
(E) Animosity

42. Recent studies demonstrate that personal memory is actually quite ——, subject to contamination and reshaping so that aspects of a person's memory are apt to be —— or erroneous.
(A) Implausible: Inaccurate (B) Volatile: Subjective✓
(C) Malleable: Insensitive (D) Inhibited: Recalcitrant
(E) Comprehensive: Reflective

43. Despite the millions of rupees spent on the improvements, the telephone system in Pakistan remains —— and continues to ——— the citizens who depend on it.
(A) Primitive: trouble✓ (B) Bombastic: up set
(C) Suspicious: connect (D) Outdated: elate

(E) Impartial: vex

44. **Contrary to popular opinion, bats are not generally aggressive and rabid, most are shy and------:**
(A) Turgid (B) Disfigured
(C) Punctual **(D) Innocuous✓**
(E) Depraved

45. **Unlike the images in the symbolist poetry which are often vague and ------, the images of surrealist poetry are startlingly, ------ and bold.**
(A) Extraneous: furtive (B) Trivial: inadvertent
(C) Obscure: concrete✓ (D) Spectacular: Pallid
(E) Symmetrical-virulent

46. **A good trial lawyer will argue only what is central to an issue, climinating ------ information or anything else which might ------ the client.**
(A) Seminal: amuse **(B) Extraneous: jeopardize✓**
(C) Erratic: enhance (D) Prodigious: extol
(E) Reprehensible: initiate

47. **Psychologists and science fiction writers argue that people persist in believing in extra□terrestrial life even though the Federal government ------ all such beliefs, because people need to feel a personal sense of ------ in a godless universe.**
(A) Decrics: morbidity (B) Endorses: despair
(C) Creates: guilty✓ (D) Discourages: spiritually
(E) Be bunks: alienation

48. **Pollen grains and spores that are 200 million years old are now being extracted from shale and are ------ the theory that the break up of the continents occurred in stages infact, it seems that the break ups occurred almost _____.**
(A) Refining: blatantly **(B) Reshaping: simultaneously✓**
(C) Countermanding: imperceptibly (D) Forging: vicariously
(E) Supporting: haphazardly

49. **Friends of the Earth is an environmental pressure group, established in UK in 1971, that aims to_____ the environment and to_____ the rational and sustainable use of the Earth's resources:**
(A) Protect: Promote **(B) Partition: Prepare✓**
(C) Produce: Provide (D) Present : Praise
(E) None of these

50. **Execution by the lethal injection although horrifying is certainly more civilized than the _____ penalty of death by torture or dismemberment:**
(A) Pervasive **(B) Viler✓**
(C) Humane (D) Prolific
(E) None of these

****

A4 Comprehension

Reading is a very important activity in our day-to-day life. We should develop our reading skills so that we are able to understand, not only what is written but also what is suggested or implied by a piece of writing. We should also be able to read quickly and efficiently; while reading we should be quite clear about our objectives. Sometimes we read just to get an idea about what is written because we are looking for information and must adjust our reading strategies accordingly.

Good reading needs the ability to apply certain skills by the reader. In particular, what is needed while reading is the ability to identify and to analyse, to infer and to evaluate. Let us look at these abilities a little more closely. To be able to identify means to be able to locate ideas and facts given in a text. To select means to be able to discriminate and to separate the relevant from the irrelevant. What is important has to be selected for analysis and what is unimportant has to be skipped over. It is true that, what the reader is looking for, will decide what is important at a given time. To analyse means to be able to see the relationship between the ideas and how they flow from one and lead to another idea. Analysis also leads to reading what is not explicitly stated in the text but is implied to the reader from what is written.

(1) Comprehension tests ascertain your ability: (A) to understand the prose passage; and (B) to remember the main points.

(2) If the comprehension tests contain more than one passage, divide the time allocated in proportion to their sizes.

(3) Do not look back at the passage, once you commence answering the questions; skip the question you can't answer.

(4) Don't spend too much time on a passage but don't rush through it either. Make sure that you understand the gist of the passage and can remember the important details.

(5) While answering comprehension passages, remember that your opinion does not matter at all. The passage contains the opinion of the author and you are asked to choose the *author's opinion* from a list of choices. The passage often contains erroneous data or unusual opinion on a subject. Therefore, even if you are certain of the correct data or the general

opinion on a subject, stick to what is given in the passage.

1. Find the topic.
2. Find the main idea.
3. Find major supporting details.
4. Find minor supporting details.

Tips to Attempt Comprehension:

To attempt comprehension, it is very important to fully understand the given passage. For this, following are a few important tips which may help you in solving this problem:

(i) Underline words you don't know the meaning.

(ii) To check the meaning in dictionary, interpret meaning by word analysis, guess the meaning from the context and the clues, it provides by way of definition, tapping your experience, providing contrast or allowing inference.

(iii) Resort to sentence analysis and break it into parts looking for answers to who, what, whom, when, where, which, why and how.

(iv) Locate reference words and check what they refer to.

(v) Underline recognized signal words and look for what they indicate.

(vi) Discover the topic.

(viii) Find the main idea.

(viii) Find out major supporting ideas.

(ix) Find out minor supporting ideas.

(x) Resort to paragraph analysis if you find steps. (vii), (viii) and (ix) difficult.

Direction: *In the following, you have passages, with questions following each passage. Read passage carefully and choose the best answer to each question and mark it in the Answer Sheet.*

At twenty-seven, Van Gogh considered himself a failure. He had been unable to make a living, much less a career as an art dealer, a teacher, or a missionary. Since he had no hope of succeeding in any field approved by a society dedicated to success, he chose what seemed the most eccentric and hopeless form of unemployment; he decided to be an artist. In spite of adversity, he sought a medium which would spread courage; wanted to show gratitude for life itself. Van Gogh did not aim to be a great artist; he merely hoped to record the faces and hardships of the painfully poor, of whom he was one of the humblest.

1. "In spite of adversity, he sought a medium which would spread courage." Which one of the following attitude to life is revealed by this statement?

(a) Defeatist
(b) Hopeless
(c) Undismayed
(d) **Adventurous✓**

2. Van Gogh considered himself a failure because:

(a) He was not as great an artist as he would have liked to be.
(b) **He could not earn a living despite the fact that he had tried several professions✓**
(c) Society did not give him the recognition he merited
(d) The profession he had chosen did not suit him.

3. **Which of the following statement may be assumed to *betrue* from the information in the passage?**
I. Van Gogh wished to depict the tribulations and suffering of the poor in his paintings.
II. Van Gogh had nothing in life for which he could be grateful.
III. Van Gogh's ambition was to become a famous painter.
IV. Van Gogh considered himself poor and humble.

(a) II and III (b) III and IV
(c) **I and IV✓** (d) I, II, III and IV

4. **The profession of an artist has been described in the passage as "the most eccentric and hopeless form of unemployment." This statement can best be considered:**

(a) Factual (b) Pessimistic
(c) **Satirical✓** (d) Realistic

Examination Questions

Everything than men do or think concerns either the satisfaction of the needs they feel or the need to escape from pain. This must be kept in mind when we seek to understand spiritual or intellectual movements and the way in which they develop, for feeling and longing are the motive forces of all human striving and productivity – however nobly these latter may display themselves to us.

What, then, are the feelings are the needs which have brought mankind to religious thought and to faith in the widest sense? A moment's consideration shows that the most varied emotions stand at the cradle of religious thought and experience.

In primitive peoples it is, first of all fear that awakens religious ideas-fear of hunger, of wild animals, of illness and of death. Since the understanding of causal connections is usually limited on this level of existence, the human soul forges a being more or less like itself, on whose will and activities depend, the experiences which it fears. One hopes to win the favour of this being by deeds and sacrifices, which according to the tradition of the race are supposed to appease the being or to make him well disposed to man. I call this the religion of fear.

This religion is considerably stabilized, though not caused, by the formation of priestly caste which claims to mediate between the people and the being they fear and so attains a position of power. Often a leader or despot will combine the function of the priesthood with its own temporal rule for the sake of greater security; or an alliance may exist between the interests of the political power and the priestly caste.

1. **'Human soul forges a being' means:**

(a) That ghosts and witches are a creation of human mind (b) That the concept of God is a creation of human mind
(c) **Both (A) and (B) ✓** (d) Neither (A) nor (B)

2. **What feeling promoted primitive man to create religion?**

(a) Love (b) Anger
(c) **Fear✓** (d) Spiritual revelation

3. **What motivates man's action or thinking?**
   (a) To carry out the dictates of his religious faith
   (b) His spiritual urge
   (c) His desire for progress or to rule
   (d) **To satisfy his needs or to escape pain✓**

4. **How did priests come to acquire political power?**
   (a) By giving religious blessing to political movements
   (b) By generating fear of the unknown in the mind of rulers
   (c) By protecting the believers against despotic rulers
   (d) **By joining hand with the despotic rulers✓**

5. **How did religion become firmly established?**
   (a) Through the growth of a priestly class
   (b) Through the establishment of religious practices
   (c) Through the perpetuation of faith in God
   (d) **Through the constant fear of death✓**

PASSAGE–1

Wang Lung worked little in his fields himself, having indeed to spend his whole time, so increased were his lands, upon the business and marketing of his produce. He was greatly hampered by his lack of book knowledge and of the meaning of characters written upon a paper with a camel's hair brush and ink. Moreover, it was a shame to him when he was in a grain shop where grain was bought and sold against, that when a contract was written for so much and for so much of wheat and rice, he must humbly ask the dealers to read it for him.

6. **Wang Lung did not work much in his fields because:**
   (a) He had to spend much of his time in learning to read and write
   (b) **He had to spend much of his time in selling grain✓**
   (c) He was a businessman of great experience
   (d) He was a landlord of great repute

7. **Wang Lung could not conduct his business dealings smoothly because he:**
   (a) Did not know the tricks of the trade
   (b) **Was illiterate✓**
   (c) Was too honest
   (d) Had no financial acumen

8. **'Characters' here mean:**
   (a) Persons with individuality
   (b) **Sign or mark used in a system of writing✓**
   (c) Letters of alphabet
   (d) Persons in books

PASSAGE – 2

Do you remember, dear, the days so long ago when we were at school, and the chemistry lab where you and I worked over messy experiments and grew to know each other? Your family had just moved to our town; I learnt that your father came from a distinguished

family and was a government official. My father was dead, and I lived with my mother in an unfashionable street. We let half our house, and my mother did fancy sewing for the well-to-do people in town. She did it proudly, with her head held high..... yet I was taken into your crowd because I was the football captain and head of the boys' class.

9. The narrator's family rented out half their house because:

(a) They wanted to have good neighbours
(b) The house was too large too them
(c) **They needed the rent badly✓**
(d) Somebody asked for it

10. They lived in an "unfashionable street" as:

(a) They wanted to follow the fashion of their choice
(b) **Things were cheaper in such streets✓**
(c) Fashions changed often there
(d) They did not like to live in a fashionable area

11. The narrator was included in his friend's "crowd" because of his:

(a) **Excellent performance✓**
(b) Affluent background
(c) Kind behavior
(d) Smart appearance

12. The narrator's mother was not ashamed of her sewing because:

(a) **She believed in the dignity of labour✓**
(b) She needed the support of her neighbours
(c) She was a good seamstress
(d) She stitched only for rich people

PASSAGE – 3

Is there any knowledge that a man must have? There clearly is no such thing, if by knowledge we mean mere acquaintance with this or that thing, fact concepts, literary work or scientific law. When two great twentieth century critics exchange blows on whether knowledge of Shakespeare is more important than knowledge of the second law of thermodynamics, they were both much to ready to assume as indispensable what a great many good and wise men have obviously got along without. We all get along without vast loads of learning that other men take as necessary marks of an educated man. If we once begin to "reason the need", we will find, like King Lear, that "our basest beggars. Are in the poorest thing superfluous."

13. If knowledge simply means acquaintance with some particular facts or ideas then:

(a) **It has little to do with the practical necessities of life✓**
(b) It is a waste of time
(c) It is not indispensable
(d) We need not possess it

14. The debate between the two great critics was essentially about:

(a) Whether science and the humanities can be reconciled
(b) **The relative need of the knowledge of science and that of the humanities✓**

(c) Whether science and literature are incompatible (d) The relative importance of Shakespeare and physics

15. **The author refers to Shakespeare and the second law of thermodynamics:**

(a) **As symbols of two different kinds of knowledge✓** (b) Because they represent the highest forms of knowledge

(c) As subjects with which every educated man should be familiar (d) As symbols of scholarship

16. **The expression "loads of learning" suggests:**

(a) Knowledge which is shown off rather than absorbed (b) Knowledge that is merely bookish

(c) **Knowledge that is more a burden than necessity✓** (d) Vast knowledge

PASSAGE – 4

"But we do not judge a cricketer so much by the runs he gets as by the way he gets them." In literature as in finance, says Washington Irving, "much paper and much poverty may co-exist." And in cricket, too many runs and much dullness may be associated. If cricket is menaced with creeping paralysis, it is because it is losing the spirit of joyous adventure and becoming a mere instrument for compiling tables of averages. There are dull, mechanical fellows who turn out runs with as little emotion as a machine turns out pins. There is no colour, no enthusiasm, no character in their play. Cricket is not an adventure to them, it is a business. It was so with Shrewsbury. His technical perfection was astonishing; but the soul of the game was wanting in him. There was no sunshine in his play, no swift surprise of spending unselfishness. And without these things, without gaiety, daring and the spirit of sacrifice cricket is a dead thing. Now the Jam Sahib has the root of the matter in him. His play is as sonny as his face. He is not a miser hoarding up runs, but a millionaire spending them, with a splendid yet judicious prodigality. It is as though his pockets are bursting with runs that he wants to shower with his blessing upon the expectant multitude. It is not difficult to believe that in his little kingdom of Nawanagar where he has the power of life and death in his hands, he is extremely popular, for it is obvious that his pleasure is in giving pleasure.

17. **What is/are true of Shrewsbury?**

I. He was a cricket player.
II. His technical knowledge about cricket was poor.
III. There was no spirit in his play.

(a) I and II (b) **I and III✓**

(c) Only I (d) None of these

18. **The author feels that:**

(a) Technical perfection is not required in playing an enjoyable cricket (b) **He who pays cricket with adventure and enthusiasm makes it enjoyable✓**

(c) He who scores a century must be a good cricketer
(d) Cricket is a monotonous game

19. **Jam Sahib:**
(a) Was a splendid cricket player
(b) Lived in Nawanagar
(c) Neither (A) nor (B) is true
(d) **Both (A) and (B) are true✓**

20. **"In literature as in finance... much paper and much poverty may co-exist." What does it mean?**
(a) Jam Sahib was rich man as he was the king of Nawanagar
(b) Shrewsbury was a poor man
(c) **The cricketer who gets lot of runs may not play an enjoyable cricket✓**
(d) None of these

21. **What gives cricket its character?**
(a) The spirit of sacrifice
(b) The spirit of joyous adventure
(c) The gaiety daring attitude of the player
(d) **All of these✓**

PASSAGE – 5

While the lion and the tiger are the focus of special conservation efforts due to their vastly reduced numbers, it is the leopard, among the big cats, that may now face the greater threat from poachers and illegal wildlife traders. The danger was brought home last year when sales inspectors stopped and searched a truck in Gilgit. They stumbled upon packages of leopard skins numbered and signed. The leopard is threatened by exactly the same predators as the tiger by traditional medicine practitioners in China, Japan and other East Asian countries. Leopard parts can easily be mistaken for a tiger's and are greatly valued by apothecaries.

22. **There is fresh reason to pay attention to the reduced number of:**
(a) Lions
(b) **Leopards✓**
(c) Tigers
(d) Cats

23. **The body parts of which animals have medicinal value in traditional Chinese medicine?**
(a) Lions
(b) Leopards
(c) **Tigers✓**
(d) All members of the cat family

24. **According to the passage, the dangerous groups that prey on animal are:**
(a) The police and the customs
(b) **Illegal hunters and**

officials
(c) Smugglers and truckers
traditional apothecaries✓
(d) Sales-tax inspectors

PASSAGE – 6

Overall the countryside, wherever one goes, indications of *technique* are visible to the seeing eye. By technique is meant an exercise of skill acquired by practice and directed to a well-foreseen end. It is the name for the action of any of our powers after they have been so improved by training as to perform that action with certainty and success.

25. **The italicized phrase in the sentence "to the seeing eye" implies:**
(a) Application of some special device of the analysis of things seen
(b) Perception caused by understanding✓
(c) Seeing with a clear eyesight
(d) Seeing the particular characteristics of things

26. **The most important aspect of "technique", as defined in the passage, is the use of skill:**
(a) For a definite purpose
(b) For observation and analysis✓
(c) For an understanding of the functions of tools and machinery
(d) For handling tools and machines

27. **'Skill' in this passage means:**
(a) The ability that has been tested by experience which makes success sure✓
(b) The ability to master education
(c) The ability to master techniques
(d) Any of our powers

28. **The word 'technique' as defined in the passage:**
(a) Practice and performance
(b) Theoretical knowledge
(c) Results
(d) Scientific methods✓

29. **The intention of the writer implies to:**
(a) Uphold the superiority of traditional techniques
(b) Reject the general meaning of the term 'technique'
(c) Mock at the modern craze for gadgets
(d) Widen the scope of the term 'technique✓

PASSAGE – 7

We stand poised precariously and challengingly on the razor's edge of destiny. We are now at the mercy of atom bombs and the like which would destroy us completely if we fail to control them wisely. And wisdom in this crisis means a vivid realization that we are literally living in one world where we must either swim together or sink together. We cannot afford to

tamper or skin together. We cannot afford to tamper with man's single minded loyalty to peace and international understanding. Anyone who does it, is a traitor not only man's past and present, but also to his future, because he is mortgaging the density to unborn generations.

30. **From the tone and style of the passage, it appears that the writer is:**
(a) Unaware of the global power situations
(b) A traitor who wishes to mortgage the density of future generations
(c) A humanist with a clear foresight
(d) **A prose writer with a fascination for images and metaphors✓**

31. **The best way to escape complete anhilation in an atomic war is to:**
(a) Ban nuclear weapons
(b) Turn to religion
(c) Invent more powerful weapons
(d) **Work for international understanding and harmony✓**

32. **The phrase "razor's edge of density" means:**
(a) A density having sharp edges
(b) A sharp line of division that marks the alternative courses of action in the future
(c) **A critical situation that foreordains the future✓**
(d) An enigma that cuts through the pattern of life like the edge of razor

33. **According to the writer, 'wisdom' in the present crisis means:**
(a) Awareness that we stand poised precariously on the razor's edge of density
(b) Determination to ban nuclear weapons
(c) Responsibility to the 'unborn generations'
(d) **Awareness of the basic values of life✓**

34. **The author is so concerned about the threat of nuclear weapons because he feels that:**
(a) A nuclear war will destroy human civilization
(b) **All countries are interlinked and one cannot escape the consequences of what happens to another country✓**
(c) The world is on the brink of disaster
(d) His country is threatened by a nuclear war

PASSAGE – 8

What is the cause of chronic fatigue? Past research has suggested a link to the Epstein-Barr virus, but now many scientists are questioning that connection. New findings suggest the Epstein-Barr virus is not a primary cause, but it may still trigger the illness. The symptoms may be due to variety of things, rather than just one; still, some researchers are sticking with the idea of Epstein-Barr virus causing the illness. They say it is premature to make such a judgment.

Chronic fatigue syndrome has been dubbed the "yuppie disease" by some since it is often diagnosed in professional women in their twenties and thirties. If may be the result of never recovering completely from illness such as the flue. Though the cause is not clear, the symptoms are: to be called a chronic fatigue sufferer, one must have the debilitating illness for more than six months and must exhibit at least eight of the eleven symptoms, including sore throat, mild fever and muscular aches.

35. **With which of the following topic is the passage mainly concerned?**

(a) A disagreement between scientists
(b) Diseases affecting yuppies
(c) The relationship between virus and an illness
(d) **Causes and symptoms of an illness✓**

36. **Why is this illness called the yuppie disease?**

(a) It has many symptoms
(b) Not one knows for sure what causes it
(c) It is difficult to treat
(d) **It affects so many young professional women✓**

37. **According to the passage, a sufferer of chronic fatigue syndrome:**

(a) **Will have eleven symptoms✓**
(b) Will have sore throat, aches and fever
(c) Will be sick for about six months
(d) Will have seven symptoms

38. **Which of the following words can best replace the word "exhibit" in the passage?**

(a) Augment
(b) Present
(c) **Manifest✓**
(d) Perform

39. **Chronic fatigue syndrome will cause which of the following?**

(a) **Weakness✓**
(b) Dizziness
(c) Rash
(d) Vomiting

40. **Which of the following statements about chronic fatigue syndrome is *true* according to the passage?**

(a) It affects only women
(b) The Epstein-Barr virus can cause premature effects of the illness
(c) **Scientists do not agree on this cause✓**
(d) A sufferer might never recover from it

PASSAGE – 9

During the seventeenth and eighteenth centuries, the Agra cemetery was considered blessed ground by Christians, and the dead were brought here from distant places ... Many historic tombs now lie scattered about the cemetery, but the most striking and curious of them is the grave of Colonel Jon Hessing, who died in 1803. It is a miniature Taj Mahal, built of red sandstone. Although small compared to a Mughal tomb, it is large for a Christian grave, and could easily accommodate a living family of moderate proportion .... Hessing, we are told, was a good, benevolent man and a great soldier. The tomb was built by his wife Alice, who, it must be supposed, felt as tenderly towards the colonel as Shahjahan felt towards his queen. She could not afford marble. Even so, her 'Taj' cost a lakh of rupees.

41. **During the seventeenth and eighteenth centuries, Christians regarded the Agra cemetery as a:**

(a) Site of religious ceremonies (b) City of the dead
(c) **Sacred burial ground✓** (d) Place for keeping dead bodies

42. **In comparison with a Mughal tomb, the grave of Colonel Jon Hessing appears:**

(a) **Small in size✓** (b) Imposing and accommodative
(c) Ridiculously insignificant (d) Both striking and curious

43. **Colonel Jon Hessing's wife has been compared with:**

(a) Alice (b) Hessing himself
(c) **Shahjahan✓** (d) Shahjahan's wife

44. **The tomb of Hessing had space enough to accommodate a:**

(a) **Family of a reasonable size✓** (b) Family of moderate means
(c) Really expanding family (d) Considerably large family

PASSAGE – 10

We sarted looking on the ground for blood, hair, or a drag mark that would lead us to the deer killed by the tiger. We had proceeded a hundred yards, examining every foot of the ground, and going dead slow, when Sohail, just as I turned my head to look at him started backwards, screaming as he did so. Then he whipped round and ran for dear life, beating the air with his hands as if warding off a swarm of bees and continuing to scream as he ran. The sudden and piercing scream of a human being in a jungle where a moment before all has been silent is terrifying to hear. Instinctively, I knew what had happened. With his eyes fixed on the ground, looking for the blood or hair of the kill, Sohail had failed to see where he was going, and had walked towards the tiger.

45. **Sohail and the narrator were scanning the ground because:**

(a) **They were looking for marks left by the tiger's** (b) They were trying to discover the tiger's

prey✓

(c) The forest was full of unpleasant surprises

(d) footprints

46. **Sohail began to scream when he:**

(a) **Stumbled on the tiger✓**

(b) They were looking for the tiger

(c) Was frightened by the sight of blood

(d) Came face to face with the tiger

47. **In the context of the passage, 'kill' means:**

(a) A wounded tiger

(b) Was attacked by a swarm of bees

(c) **An animal killed by the tiger✓**

(d) A human being killed by the tiger

48. **Before Sohail screamed, the jungle was:**

(a) Terrifying

(b) Noisy

(c) Dark

(d) **Quiet✓**

PASSAGE – 11

The Pakistani psyche remains today wholly untouched by any thought of the need for wider and more value-based education. Education has never been a high-priority item in any Pakistani political party's manifesto. The subject which should have galvanized the nation into action fifty years ago is still kept in cold store. Without the guidance which can be derived only from liberal education, a whole generation has grown up which is content to see crime and terrorism become the order of the day... The criminalization of politics and the deplorably low moral tone of our public life are the direct consequences of the failure to impart value-based education.

49. **The author regrets that Pakistanis today are not concerned with:**

(a) **Moral education✓**

(b) Basic education

(c) Political education

(d) Content-based education

50. **The role of education in Pakistani national life has been emphasized by:**

(a) **No political party✓**

(b) The majority of political parties

(c) Some political parties

(d) All political parties

51. **Lack of liberal education, in the country has:**

(a) Subverted the ideal of socialism

(b) **Given rise to crime and terrorism ✓**

(c) Disintegrated the fabric of society

(d) Undermined the importa of democracy

52. **A generation which will receive value-based education will be:**

(a) In favour of promoting communal tensions

(b) Averse to peace and harmony

(c) Prone to communalism but not casteism
(d) **Averse to communalism and casteism✓**

PASSAGE – 12

When I was teaching English at a school, I used to ask my students the kind of questions that English teachers usually ask about reading assignments—questions designed to bring out the points that I had decided they should know. They, on their part, would try to get me to give them hints and clues as to what I wanted. It was a game of wits. I never gave my students an opportunity to say what they really thought about a book. But looking back, I realize that many of my methods were foolish.

53. As a teacher of English, the author always asked questions which:

(a) He thought that his students should answer
(b) **The students should have been able to answer✓**
(c) Arose naturally from his teaching
(d) The students wanted answered

54. Denying the students the opportunity to express their own opinion was wrong because:

(a) **The students took it only as a game✓**
(b) It encourages the students to learn by rote
(c) It failed to develop independence of thought
(d) It only made them more restless

55. The students never expressed their own opinions about a book because:

(a) They were unusually tongue-tied
(b) **The teacher did not encourage them to do so✓**
(c) The teacher never encouraged them to speak at all
(d) They were too afraid of the teacher to speak

PASSAGE – 13

It's role reversal that has allowed students to assess their teachers. The parameters for such an evaluation are many, including the teacher's regularity, competence in imparting understanding of and completing the course content, and the ability to motivate students, particularly through the use of innovative teaching methods. It is time to bring this practice to our universities and colleges where teachers often regard their jobs as a sinecure, which they can hang on to while free lancing as private tutors. There are other complaints against them: that they read from notes prepared decades ago. The teachers, on their part, might say that they are frustrated because the students show no interest in studies and skip classes at the drop of a hat.

56. The author of the passage says that:

(a) **The teachers do not do their duty sincerely✓**
(b) The university authorities are sincere in their work
(c) Both the teachers and students are not serious
(d) The students do not take studies seriously

about studies

57. **The word 'sinecure' in the passage means:**
(a) A secured position
(b) A job of good status
(c) **Money without work✓**
(d) Less money for more work

58. **The quality of teaching will improve if:**
(a) Private tutoring is stopped
(b) The teachers prepare fresh notes
(c) The students are forced to attend classes
(d) **The students are allowed to evaluate their teachers✓**

PASSAGE – 14

There are many types of protein molecules in the body, and each type is specific to its function. For example, proteins such as keratin and collagen give strength and elasticity to hair, as well as to skin and tendons; haemoglobin and myoglobin are the oxygen-binding proteins of the blood and the muscle, respectively; and ovalbumin, the principal protein of egg white is responsible for setting and foaming properties of eggs. A particularly important group of proteins known as enzymes, directs all the body cells' chemical reactions. These reactions provide the basis of every type of cell activity, including growth, repair the production of energy and the excretion of waste products.

59. **From the passage, it is clear that there are several types of proteins which:**
(a) Have interchangeable functions
(b) Are found in all organisms
(c) **Carry out specific tasks✓**
(d) Can create problems in our body

60. **Proteins are classified according to:**
(a) The part of the body they are found in
(b) **Their functions✓**
(c) Their names
(d) The number of molecules

61. **The function of the enzymes is to:**
(a) Set and form properties of an egg
(b) Give strength and elasticity to hair
(c) Bind oxygen in the blood
(d) **Direct chemical reactions in body cells✓**

PASSAGE – 15

My father and mother were the complements of each other. My mother was fragile, my father robust. Her face was responsive, my father's impassive. My mother's face rippled to emotions as waters to the wind. My mother was not intellectual. Her natural propensity was intuitive. Her face illustrated the saying: "Appearances are deceptive", for it did not show the immense strength of her moral convictions. No one could have inferred from it that she was capable of such fanaticism as she showed over them.

62. **By saying that his mother was the complement of his father, the author suggests that he was:**

(a) Indifferent to his father (b) **Different from his father✓**
(c) Opposed to his father (d) Like his father

63. **The words "her face was responsive" mean that:**
(a) One had to look at her face when she spoke (b) Her face was passive
(c) Her face was very attractive (d) **Her face clearly showed her feelings✓**

64. **The author's mother held strong views based on:**
(a) **Ethical judgments✓** (b) Social customs
(c) Legal provisions (d) Religious scriptures

PASSAGE – 16

While it is true that there is no law that compels us to say 'please', there is a social practice much older and much more sacred than any law which enjoins us to be civil. And the first requirement of civility is that we should acknowledge a service. 'Please' and 'Thank You' are the small change with which we pay our way as social beings. They are the little courtesies by which we keep the machine of life oiled and running sweetly. They put our intercourse upon the basis of a friendly cooperation, and easy give and take instead of on the basis of superiors dictating to inferiors. It is a very vulgar mind that would wish to command where he can have the service for the asking, and have it with willingness and good feeling instead of resentment.

65. **According to the author:**
(a) We should no say 'Pleas' as it is against the law (b) We may or may not say 'Please' according to our mood
(c) To say please is an outdated custom (d) **We must say 'Please' as it is a civilized custom✓**

66. **The writer thinks that:**
(a) Courtesies make life mechanical (b) **Courtesies make life pleasant✓**
(c) The less the courtesies, the more the frankness in our life (d) Courtesies make life oily and sticky

67. **The writer is of the opinion that:**
(a) 'Please' should be used by inferiors and 'Thank You' by superiors (b) **'Please' and 'Thank You' should be used by everybody✓**
(c) Friends should use 'Please' and 'Thank you' only among themselves (d) Only subordinates should use 'Please' and 'Thank You' when talking to superiors

****

B Quantitative Reasoning |25 MCQs|

The basic mathematical skills, understanding of elementary mathematical concepts, and the ability to reason quantitatively and solve problems in a quantitative setting are measured in the quantitative part of the test. The knowledge of arithmetic, algebra, geometry and data-analysis, which are usually essential area of study of the high school level are measured in balanced questions. The questions about quantitative ability can also be asked from:

- *Discrete Quantitative Questions*
- *Quantitative Comparison Questions*

B1 Arithmetic |06 MCQs|

Chapter 1
NUMBERS

Numbers: In decimal number system, we use ten symbols 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 called digits, to represent any number.

Note: A group of figures, denoting a number is called numeral.

Types of Numbers

Natural Numbers: Numbers which we use for counting the objects are known as natural numbers. It is denoted by 'N'.

$$N = \{1, 2, 3, 4 \ldots\ldots\}$$

Whole Numbers: All Natural Numbers together with zero form the set of all whole numbers. It is denoted by 'W'.

$$W = \{0, 1, 2, 3, \ldots\ldots\}$$

Integers: The set of numbers which consists of whole numbers and negative numbers is known as integers. It is denoted by Z.

$$Z = \{\ldots\ldots -3, -2, -1, 0, 1, 2, 3, \ldots\ldots\}$$

Positive Integers: The set $Z^+ = \{1, 2, 3, 4, \ldots\ldots\}$ is the set of all positive integers. It is clear that positive integers and natural numbers are synonyms.

Negative Integers: The set $Z^- = \{-1, -2, -3, \ldots\ldots\}$ is the set of all negative integers.

Remember: "0" is neither positive nor negative.

Non-Negative Integers: The set {0, 1, 2, 3, ...} is a set of non-negative integers.
Non-Positive Integers: The set {0, −1, −2, −3, ...} is the set of non-positive integers.
Even Numbers: The numbers which are divisible by 2 are called Even Numbers.
$E = \{2, 4, 6, ...\}$
Odd Numbers: The numbers which are not divisible by 2 are called Odd Numbers.
$O = \{1, 3, 9, 11, 19, ...\}$

Properties of zero:

1. 0 is neither positive nor negative.
2. 0 is an even integer.
3. 0 is smaller than every positive number.
4. 0 is greater than every negative number.
5. For any integer p; $p \times 0 = 0$.
6. For any integer p (including 0): $p \div 0$ = undefined.
7. For any positive integer p; $0 \div p$; $\frac{0}{p} = 0$.
8. For every integer p; $p + 0$ and $p - 0 = p$.
9. If the product of two or more numbers is 0, then at least one of them is 0.

Properties of one:

1. For any number p: $p \times 1 = p$ and $\frac{p}{1} = p$.
2. 1 is the divisor of every integer.
3. 1 is an odd integer.
4. 1 is not a prime number, because prime numbers should be greater than 1.
5. 1 is the smallest positive integer.
6. For any integer n : $1^n = 1$.

Factors and Multiples: A number which divides a given number exactly is called a factor of the given number.

Example 1: Find the factors of (i) 64 and (ii) 75.

Solution: (i) $64 = 1 \times 64$
$= 2 \times 32$
$= 4 \times 16$
$= 8 \times 8$

The factors of 64 are 1, 2, 4, 8, 16, 32 and 64.

(ii) $75 = 1 \times 75$
$= 3 \times 25$
$= 5 \times 15$

The factors of 75 are 1, 3, 5, 15, 25 and 75.

Division Algorithm: Let a and b be two given integers such that $b \neq 0$. On dividing a by b, let q be the quotient and r the remainder, then $a = bq + r$.

Clearly, $0 < r < b$

In general, we have Dividend = (Divisor × Quotient) + Remainder

Multiple of a Number:

A multiple of any natural number is a number obtained by multiplying that number by any natural number.

Example: Find the multiples of:
(i) 4 less than 30 (ii) 9 less than 60

Solution: (i) $4 \times 1 = 4$
$4 \times 2 = 8$
$4 \times 3 = 12$
$4 \times 4 = 16$
$4 \times 5 = 20$
$4 \times 6 = 24$
$4 \times 7 = 28$ etc.

∴ The multiples of 4 less than 30 are 4, 8, 12, 16, 20, 24 and 28.

(ii) $9 \times 1 = 9$
$9 \times 2 = 18$
$9 \times 3 = 27$
$9 \times 4 = 36$
$9 \times 5 = 45$
$9 \times 6 = 54$ etc.

∴ The multiples of 9 less than 60 are 9, 18, 27, 36, 45 and 54.

Divisible of a Number:

If a number divides a second number without leaving any remainder, then we say that the second number is divisible by the first number. For example, since the number 2 divides 14 without leaving any remainder, we say that 14 is divisible by 2.

Multiple Choice Questions (MCQs)

Q1. How many numbers between 200 and 500 are divisible by 13?
(A) 23 (B) 17
(C) 15 (D) 32

Q2. The first five multiples of 17 are:
(A) 0, 1, 17, 34, 51 (B) 17, 34, 51, 68, 85
(C) 38, 57, 76, 95, 114 (D) None of these

Q3. The number which is divisible by 7 but not by 14 is:
(A) 21 (B) 12
(C) 71 (D) None of these

Q4. The total number of even prime numbers is:
(A) 0 (B) 1
(C) 2 (D) None of these

Q5. The least prime number is:
(A) 0 (B) 1

(C) 2 (D) 3

Explanatory Answers

Q1.(A) Number of numbers up to 200 which are divisible by 13

$$= \frac{200}{13} = 15 + \frac{5}{13}, \text{ i.e., } 15$$

Number of numbers up to 500 which are divisible by 13

$$= \frac{500}{13} = 38 + \frac{6}{13} \text{ i.e., } 38$$

The required numbers = 38 – 15 = 23
Hence, the correct answer is choice A.

Q2.(B) The first five multiples of 17 are

$$17 \times 1 = 17$$
$$17 \times 2 = 34$$
$$17 \times 3 = 51$$
$$17 \times 4 = 68$$
$$17 \times 5 = 85$$

First five multiples of 17 are 17, 34, 51, 68 and 85.

Q3.(A) The number which is divisible by 7 but not by 14 is 21. Hence, the correct answer is choice A.

Q4.(B) There is only one even prime number, namely 2. Hence, the correct answer is choice C.

Q5.(C) The least prime number is 2. Hence, the correct answer is choice C.

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Chapter 2
MULTIPLICATION AND DIVISION

MULTIPLICATION: Multiplication is a short method of adding the same number repeatedly.

PROPERTIES OF MULTIPLICATION:

1. Multiplication is commutative for rational numbers.
   Example:

$$\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd} = \frac{c}{d} \times \frac{a}{b}$$
$$\frac{2}{3} \times \frac{5}{7} = \frac{10}{21} = \frac{5}{7} \times \frac{2}{3}$$

2. Multiplication is associative for rational numbers.
   Example:

$$\frac{a}{b} \times \left(\frac{c}{d} \times \frac{e}{f}\right) = \frac{ace}{bdf} = \left(\frac{a}{b} \times \frac{c}{d}\right) \times \frac{e}{f}$$
$$\frac{2}{3} \times \left(\frac{5}{7} \times \frac{11}{13}\right) = \frac{110}{273} = \left(\frac{2}{3} \times \frac{5}{7}\right) \times \frac{11}{13}$$

3. Multiplication is distributive over addition and subtraction for rational numbers.
Example:

$$\frac{a}{b}\times\left(\frac{c}{d}\pm\frac{e}{f}\right) = \frac{a}{b}\times\frac{c}{d}\pm\frac{a}{b}\times\frac{e}{f}$$

$$\frac{2}{3}\times\left(\frac{5}{7}\pm\frac{11}{13}\right) = \frac{2}{3}\times\frac{5}{7}\pm\frac{2}{3}\times\frac{11}{13}$$

4. For any rational number $\frac{x}{y}, \frac{x}{y}\times 1 = \frac{x}{y} = 1\times\frac{x}{y}$, one is called multiplicative identity.

5. Two rational numbers $\frac{a}{b}$ and $\frac{b}{a}$ are the multiplicative inverses of each other.

$$\frac{a}{b}\times\frac{b}{a} = 1 = \frac{b}{a}\times\frac{a}{b}$$

Note: The sign of the product is –ive, if there are an even number of negative factors or there are no negative factors. The sign of the product is –ive, if there are an odd number of negative factors

DIVISION

The process of subtraction of the same number from a given number for a few times is called division (÷), *i.e.*,

$$6 \div 2 = 3$$

(2 can be subtracted 3 times from 6)

IMPORTANT POINTS

1. Division is the inverse operation of multiplication. For example $6 \div 2 = 3$ means to find the number by which 2 should be multiplied so as to obtain 6.
   Because $3 \times 2 = 6$
   Therefore, $6 \div 2 = 3$
2. When a number is divided by another number, the first number *i.e.* the number which is being divided is called the ***dividend***, the second number which divides is called the **divisor** and the number obtained as a result of division is called the **quotient**. In the above example, 6 is the dividend, 2 is the divisor and 3 is the quotient.
3. The operation of division starts from the left whereas the operations of addition, subtraction and multiplication start from the right.

Divisibility:

The following table gives the rules to test the divisibility from 2 to 25.

Divisibility by	If	Example
2	Any number in the unit's place which is either even or zero.	12, 10, 26, 32, 38, 567992, 11110234
3	The sum of digits is divisible by 3.	321 : 3 + 2 + 1 = 6 is divisible by 3.
4	The last two digits of a number is divisible by 4.	725324 : 24 is divisible by 4.
5	The number ends with 5 or zero.	4112370, 5321095, 3331210, etc.
6	A number is divisible by 2 and the sum of the digits of the number is multiple of 3.	342, 63924, 154, 261 etc.

Divisibility by	If	Example
8	The last three digits of a number is divisible by 8. or The last three digits of a number are zero.	2125000, 135923120, 7792320, 1256, etc.
9	The sum of all the digits of a number is divisible by 9.	33456735 : 3 + 3 + 4 + 5 + 6 + 7 + 3 + 5 = 36 divisible by 9.
10	Any number which ends with zero.	70, 789790, 7111130, 5773313570, 112300100 etc.
11	The sum of digits at odd and even places are respectively equal or differ by a number divisible by 11.	4235682 : Sum 1 = 4 + 3 + 6 + 2 = 15 Sum 2 = 2 + 5 + 8 = 15 Sum 1 = Sum 2, the number is divisible by 11. or 283712 : Sum 1 = 2 + 3 + 1 = 6 and Sum 2 = 8 + 7 + 2 = 17, their differ 17 – 6 = 11 is divisible by 1.
12	The number which is divisible by both 4 and 3.	135792 etc.
14	The number which is divisible by both 2 and 7.	98, 504 etc.
15	The number which is divisible by 3 and 5.	360, 733352215 etc.
16	The number whose last 4 digit number is divisible by 16.	253421020, 27954204 etc.
18	Any number which is divisible by 9 and has its last digit even (or zero).	2709360, 252630 etc.
25	The number formed by the last two digits of the number is divisible by 25.	257275, 25277750 etc.

Model Examples:

Q1. Multiply 63987 by 91763 is not more than 3 lines.

Solution:

$$\begin{array}{rl} & 63987 \\ (\times) & 91763 \\ \hline & 4031181 \quad \text{Multiplication by } 63 \\ & 447909\times\times \quad \text{Multiplication by } 700 \\ & 5822817\times\times\times \quad \text{Multiplication by } 91000 \\ \hline & 5871639081 \end{array}$$

Q2. Find the number, one-sixth of which exceeds its one-ninth by 654.

Solution: Let the number be x

$$\therefore \quad \frac{x}{6} - \frac{x}{9} = 654 \qquad \frac{x}{18} = 654$$

$$\Rightarrow \quad x = 654 \times 18 = 11772 \quad \text{Ans.}$$

Q3. The speed of mail train is 1,370 meters per minute. Express it in miles per hour correct to three significant figures, given that 1 metre = 39.37 inches.

Solution: Speed of mail train = 1,370 metres per minute

$= 1370 \times 60$ metres per hour

$= \frac{1370 \times 60 \times 39.37}{12 \times 3 \times 1760}$ miles per hour

$= 51.077$ miles per hour Ans.

Q4. A boy when asked to multiply a number by 7/8, divided this instead, by 7/8 and found the answer $1\frac{1}{14}$ too great. Find the number and the correct answer.

Solution: Let the number be 'x'

$$\therefore \quad \left(x \div \frac{7}{8}\right) - \left(x \times \frac{7}{8}\right) = \frac{15}{14}$$

$$\frac{8x}{7} - \frac{7x}{8} = \frac{15}{14}$$

$$\frac{64x - 49x}{56} = \frac{15}{14}$$

or $$\frac{15x}{56} = \frac{15}{14}$$

$$\therefore \quad x = \frac{56 \times 15}{14 \times 15} = 4 \quad \text{Ans.}$$

Correct answer $= 4 \times \frac{7}{8} = 3\frac{1}{2}$ Ans.

Q5. The sum of the squares of two consecutive integers is 1105. Find the integers and check your answer.

Solution: Let the two consecutive positive numbers be:

$x, x + 1$

Then sum of the squares of these consecutive numbers = 1105

$$\therefore \quad x^2 + (x+1)^2 = 1105$$

$$x^2 + x^2 + 2x + 1 = 1105$$

$$2x^2 + 2x - 1104 = 0$$

$$x^2 + x - 552 = 0$$

or $$x^2 + 24x - 23x - 552 = 0$$

$$x(x + 24) - 23(x + 24) = 0$$

$$(x - 23)(x + 24) = 0$$

$$\Rightarrow \quad x = 23 \quad \text{or} \quad x = -24$$

Since, the two consecutive numbers are +ve integers, therefore, we neglect the –ve number.

Thus the two consecutive numbers are 23 and 24. Ans.

Check:

$(23)^2 + (23 + 1)^2 = 1105$

$529 + 576 = 1105$

$1105 = 1105$

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Chapter 3

HIGHEST COMMON FACTOR & LEAST COMMON MULTIPLE

HIGHEST COMMON FACTOR & LEAST COMMON MULTIPLE

The highest common factor of two or more numbers is the greatest number which divides each of them exactly.

Methods of finding H.C.F.

(i) *By Prime Factors.*

Resolve the given number into their prime factors. The product of all prime common factors is known as H.C.F.

Model Example: Find the H.C.F. of 630, 1050 and 1260.

Solution:

$630 = 2 \times 3 \times 3 \times 5 \times 7$

$1050 = 2 \times 3 \times 5 \times 5 \times 7$

$1260 = 2 \times 2 \times 3 \times 3 \times 5 \times 7$

$\therefore$ H.C.F. is $2 \times 3 \times 5 \times 7 = 210$. **Ans.**

(ii) *By Division:*

Find the H.C.F. of 5133 and 3953

$$
\begin{array}{r}
3953\overline{)\,5133\,(1} \\
\underline{3953} \\
1180\overline{)\,3953(3} \\
\underline{3540} \\
413\overline{)\,1180(2} \\
\underline{826} \\
354\overline{)\,413(1} \\
\underline{354} \\
59\overline{)\,354(6} \\
\underline{354} \\
\times
\end{array}
$$

Various Steps:

Step I. Dividing the greatest number by the lesser, we get the remainder 1180.

Step II. Dividing the previous divisor 3953 by 1180, we get the remainder 413.

Step III. Dividing the previous divisor 1180 by 413 we get the remainder 354.

Step IV. Dividing the previous divisor 413 by 354 we get the remainder 59.

Step V. Dividing the previous divisor 354 by 59 we get no remainder.

$\therefore$ The last divisor 59 is the H.C.F.

Note: H.C.F. is also known as Greatest Common Measure (G.C.M.)

LEAST COMMON MULTIPLE (L.C.M)

The Least Common Multiple of two or more given numbers is the least number which is exactly divisible by each of them.

Methods of Finding L.C.M.

(i) *By Factors.* Resolve the given numbers into prime factors, and find the product of the highest powers of all the factors that occur in the given number. The product will be the required L.C.M.

Model Example

Q1. Find the L.C.M. of 70, 80, 90.

Solution: $70 = 2 \times 5 \times 7$

$80 = 2^4 \times 5$

$90 = 2 \times 3^2 \times 5$

L.C.M. $= 2^4 \times 3^2 \times 5 \times 7 = 5040$ Ans.

(ii) ***With the help of H.C.F.*** The product of two numbers is equal to the product of their L.C.M. and H.C.F.

$$\therefore \text{ L.C.M. of two numbers} = \frac{\text{Product of numbers}}{\text{H.C.F.}}$$

L.C.M. and H.C.F. of Factions.

The L.C.M of two or more fractions is the least fraction or integer which is exactly divisible by each of them.

$$\text{L.C.M. of two or more fractions} = \frac{\text{L.C.M. of numerators}}{\text{H.C.F. of denominators}}$$

H.C.F. of two or more fractions

The H.C.F of two or more fractions is the highest fraction which is exactly divisible by each of the fraction.

$$= \frac{\text{H.C.F. of numerators}}{\text{L.C.M. of denominators}}$$

Model Examples

Q1. The H.C.F. of two numbers is 34 and their L.C.M. is 4284. If one of the numbers is 204, find the other.

Solution: As product of 2 numbers = their H.C.F. × L.C.M.

$$\text{The other number is} = \frac{34 \times 4284}{204}$$

$= 714$ **Ans.**

Q2. What is the highest number of four digits which will leave a remainder of 1 when divided by any of numbers 6, 9, 12, 15, or 18?

Solution: L.C.M. of 6, 9, 12, 15, 18 = 180

Greatest no. of 4 digits = 9999

Greatest no. of 4 digits divisible by

$180 = 9999 - 99 = 9900$

$$\begin{array}{r} 55 \\ 180\overline{)9999} \\ \underline{900} \\ 999 \\ \underline{900} \\ 99 \end{array}$$

$\therefore$ Reqd. No. $= 9900 + 1 = 9901$ **Ans.**

Q3. Three men A, B and C go walking round a circle one mile in circumference at the rates of 160, 120 and 105 yards per minute, respectively. If they all start together and walk in the same direction, when will they first be together again?

Solution: Circumference of the circle
= 1 mile or 1760 yds.

A will complete the circle in
$$= \frac{1760}{160} = 11 \text{ min.}$$

B will complete the circle in
$$= \frac{1760}{120} = \frac{44}{3} \text{ min.}$$

C will complete the circle in
$$= \frac{1760}{105} = \frac{352}{21} \text{ min.}$$

L.C.M. of 11, $\frac{44}{3}, \frac{352}{21} = 352$ minutes.

i.e., they will be together again first after 352 min. or 5 hrs. 52 min. **Ans.**

H.C.F of $11, \frac{44}{3}, \frac{352}{21}$

Multiplying by 21

$11 \times 21, \frac{44}{3} \times 21, \frac{352}{21} \times 21$

7	231 – 308 – 352
11	33 – 44 – 352
4	3 – 4 – 32
	3 – 1 – 8

L.C.M =
$$\frac{7 \times 11 \times 4 \times 3 \times 8}{21}$$
$$= \frac{7392}{21} = 352$$

Multiple Choice Questions (MCQs)

Q1. A neon sign flashes every 3 seconds, another sign flashes every 5 seconds, and a third flashes every 7 seconds. If they all flash together, how many seconds will pass before they all flash simultaneously again?

(A) 15 seconds (B) 35 seconds
(C) 105 seconds (D) 21 seconds

Q2. The greatest number which exactly divides 1155 and 735 is:

(A) 25 (B) 5
(C) 15 (D) 105

Q3. The least number which when divided by 35, leaves remainder of 25; when divided by 45 leaves a remainder of 35 and when divided by 55 leaves 45 as remainder, is:

(A) 3455 (B) 3465
(C) 3475 (D) 10

Q4. The L.C.M of 12,20,24,32 is:

(A) 240 (B) 360
(C) 480 (D) 600

Q5. How many whole bricks $6 \times 12 \times 24$ cm^3 will be sufficient to construct a solid cube of minimum size?

(A) 4 (B) 6
(C) 8 (D) 12

Explanatory Answers

Q1. (C) The L.C.M of 3,5 and 7 will give the answer

3	3 – 5 – 7
5	1 – 5 – 7
7	1 – 1 – 7
	1 – 1 – 1

$= 3 \times 5 \times 7 = 105$

Q2. (D) The required number is the H.C.F of 1155 and 735

$$735 \overline{)1155}\ (1$$
$$420 \overline{)735}\ (1$$
$$315 \overline{)420}\ (1$$
$$105 \overline{)315}\ (3$$
$$315$$
$$\times$$

The greatest number required is 105.

Q3. (A) The least number which is completely divided by 35, 45 and 55, is their L.C.M. which is 3465. We want to find the least number which on dividing by 35, 45 and 55 leave remainders 25, 35 and 45 respectively *i.e.*, 10 less than the quotient in each case. Hence such a number is 3465 – 10 = 3455

Q4. (C)

2	12–20 – 24–32
2	6 – 10 – 12 – 16
2	3 – 5 – 6 – 8
2	3 – 5– 3 – 4
2	3 – 5– 3 – 2
3	3 – 5– 3 – 1
5	1 – 5 – 1 – 1
	1 – 1 – 1 – 1

The L.C.M. of 12, 20, 24 and 32 is

$2^5 \times 3 \times 5 = 32 \times 3 \times 5 = 480$

Q5. (C) One edge of the minimum cube must be 24 cms, the least common multiple of 6, 1 and 24. Thus, it will have a volume of $24 \times 24 \times 24$ cubic centimeters which is equal 8 bricks

i.e., $$\frac{24 \times 24 \times 24}{6 \times 12 \times 24} = 8$$

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Chapter 4
SQUARE ROOT

Methods of Finding Square Root:

(I) *By Factors.* Resolve the number into its prime factors. The square root is the product of

prime factors taken half as many times as they occur in the number.

(ii) ***By Division.***

Model Example: Find the square root of 2480625.

Solution:

1	2480625	(1575
	1	
25	148	
	125	
307	2306	
	2149	
3145	15725	
	15725	
	×	

∴ **Ans.** 1575

Q2. Find the square root of 43.45 to four decimal places.

Solution:

6	43.45	(6.5916
	36	
125	7.45	
	6.25	
1309	12000	
	11781	
13181	21900	
	13181	
131826	871900	
	790956	
	80944	

As remainder is more than half 6.5917 **Ans.**

Q3. Find the value of $\sqrt{\frac{2+\sqrt{3}}{2-\sqrt{3}}}$ correct to three decimal places.

Solution: $\sqrt{\frac{2+\sqrt{3}}{2-\sqrt{3}}} = \sqrt{\frac{(2+\sqrt{3})(2+\sqrt{3})}{(2-\sqrt{3})(2-\sqrt{3})}}$ (Rationalization)

$$= \sqrt{\frac{(2+\sqrt{3})^2}{(2)^2-(\sqrt{3})^2}}$$

$$= \sqrt{\frac{(2+\sqrt{3})^2}{4-3}} = 2+\sqrt{3} = 2+1.732$$

$= 3.732$ **Ans.**

UNITARY METHOD AND CHAIN RULE

IMPORTANCE:
The unitary method and chain rule have quite an importance in our daily life. It is explained by the following model examples.

Model Examples:

Q1. In a kilometer race A can beat B by 40 metres and B can beat C by 50 metres. How many metres can A beat C in a 500 metres race?

Solution: Let A covers 1000 m.
Then B covers: $1000 - 40 = 960$ m.
and When B covers 1000 m.
then C covers $1000 - 50 = 950$ m.
$\therefore$ When B covers 960 m.

$$\text{C covers } \left(\frac{950}{1000}\times 960\right)\text{m} = 912 \text{ m.}$$

i.e., when A covers 1000 m. C covers $= \frac{912}{2}$ m
$= 456$ m.

or when A covers 500 m. race, A will beat C by
$= 500 - 456 = 44$ m.

Q2. Divide Rs. 510 between A, B and C so that A gets 2/3 of what B gets and B gets ¼ of what C gets. Find the share of each.

Solution: Let C's share be Rs. x

$\therefore$ B's share is $= \frac{x}{4}$

A's share is $= \frac{2}{3}\times\frac{x}{4} = \text{Rs. } \frac{x}{6}$

Total amount $= \text{Rs. } 510$

$\therefore$ $x + \frac{x}{4} + \frac{x}{6} = 510$

$\frac{12x + 3x + 2x}{12} = 510$

$\therefore$ $x = \frac{12\times 510}{17} = 360$

$\therefore$ A's share $= \frac{360}{6} = \text{Rs. } 60$

B's share $= \frac{360}{4} = \text{Rs. } 90$

C's share $= \text{Rs. } 360$

} Ans.

Q3. Divide Rs. 600 among A, B, and C so that Rs. 40 more than 2/5 of A's share, Rs. 20 more than 2/7 of B's share, Rs. 10 more than $\frac{9}{17}$ of C's share may be equal.

Solution: Let $\frac{2}{5}$ of A's share + Rs. 40 = $\frac{2}{7}$ of B's share + Rs. 20 = $\frac{9}{17}$ of C's share + Rs. 10 be = x.

$$\therefore \quad \frac{2}{5} \text{ of A's share} = x - 40$$

$$\text{A's share} = \frac{5}{2}(x-40)$$

or

$$\text{B's share} = \frac{7}{2}(x-20)$$

Similarly

$$\text{C's share} = \frac{17}{9}(x-10)$$

As total amount = Rs. 600

$$\therefore \quad \frac{5x-200}{2} + \frac{7x-140}{2} + \frac{17x-170}{9} = 600$$

$$\frac{45x-1800+63x-1260+34x+340}{18} = 600$$

or $$142x - 3400 = 600 \times 18 = 10800$$

$$142x = 10800 + 3400 = 14200$$

$$x = \frac{14200}{142} = 100$$

$$\therefore \quad \left.\begin{aligned} \text{A's share} &= \frac{5}{2}(100-40) = \text{Rs. } 150 \\ \text{B's share} &= \frac{7}{2}(100-20) = \text{Rs. } 280 \\ \text{C's share} &= \frac{17}{9}(100-10) = \text{Rs. } 170 \end{aligned}\right\} \text{ Ans.}$$

Q4. A garrison has enough provision for 52 days. After 20 days, a reinforcement of 400 men arrives and the food would then last for 24 days only. How many men were there in the garrison originally?

Solution: Let there be *x* men in the garrison originally. After 20 days no. of men = x + 400.

If these men had not joined, the provision would have lasted for 50 – 20 = 32 days more.

$\therefore$ For x men the provision can last for 32 days

For 1 men the provision in last for 32*x* days

For (*x* + 400) men of provision can last for $\frac{32x}{x+400}$ days

But provision lasted for 24 days

$$\therefore \quad \frac{32x}{x+400} = 24$$

or $32x = 24x + 9600$

or $8x = 9600$

$x = 1200$ men. Ans.

Multiple Choice Questions (MCQs)

Q1. What is the least positive integer which is to be added to 57592910 so that the sum may be a perfect square?
(A) 7588 (B) 7
(C) 11 (D) 15166

Q2. A rectangular field which is twice as long as it is broad, has an area of 14450 m², what is its perimeter?
(A) 85 m (B) 510 m
(C) 165 m (D) 170 m

Q3. The cost of the planting sugarcane at the rate of 6 paisa per square meter is Rs. 5840.64. What is the length of side of this square field:
(A) 312 m (B) 622 m
(C) 97344 m (D) 459 m

Q4. What is the smallest number which when subtracted from 1.00060219 gives a perfect square number?
(A) 0.00210 (B) 210
(C) 0.00000210 (D) 0.210

Q5. The product of 313 with itself is:
(A) 97969 (B) 17.69
(C) 5536.97 (D) 195938

Explanatory Answers

Q1. (C) 57592910 is greater than the square of 7588 (using calculator). The next squared is the square of 7589. $(7589)^2 = 57592921$.
Now 57592921 – 57592910 = 11, which is the required integer to be added.

Q2. (B) As the length is twice as long as width and so its rectangle can be divided into 2 square regions

The area of each square region $= \frac{14450}{2} = 7225\text{m}^2$

Now length of each region = Width of the field × 2
$= \sqrt{7225}$
$= 85\text{m}$
$= 85 \times 2 = 170\text{m}$

Perimeter $= 2(170 + 85)$

$= 2(255)$
$= 510m$

Q3. (A)

Cost $=$ Rs. 5840.64
$=$ 584064 paisas

Area $= \frac{584064}{6} = 97344$

Side $= \sqrt{97344}$
$= 312$ m

Q4. (C)

$$\begin{array}{r|l} 1 & 1.00\,06\,02\,19 \;(1.0003 \\ & 1 \\ \hline 2.0003 & 00\,06\,02\,19 \\ & 6\,00\,09 \\ \hline & 210 \end{array}$$

There are eight places after the decimal in the given number. so after subtracting .0000021 from the given number the remainder would be zero. So .0000021 is the required number.

Q5. (A) $313 \times 313 = 97969$

****

Chapter 5
FRACTIONS & DECIMALS

FRACTIONS: If any unit be divided into any number of equal parts, one or more of these parts is called a fraction of the unit.

example : The fractions one-fourth, two-third and three-fourth are respectively written as $\frac{1}{4}, \frac{2}{3}$ and $\frac{3}{4}$

NUMERATOR AND DENOMINATOR:

The upper number, which shows the number of parts taken to form the fraction, is called numerator.

The lower number, which indicates the number of equal parts in which the unit is divided, is called denominator.

Terms of The Fraction:

The numerator and the denominator of a fractions are called its terms.

Note: A fraction is also called a rational number.

Lowest Terms of a Fraction:

When the numerator and the denominators of a fraction have no common factor, the fraction is said to be is its lowest terms:

example : $= \frac{6}{10} = \frac{3\times2}{5\times2}$

In the above example denominator and the numberator have a common factor, thus $\frac{6}{10}$ is not is its lowest terms. If we cancel out 2 by dividing numerator and denominator by 2 we find $\frac{3}{5}$, which has no common factor. hence $\frac{3}{5}$ is in its lowest terms.

Proper Fraction:

A proper fraction is one whose numerator is less than the denominator.

example : $\frac{2}{3}, \frac{5}{7}, \frac{23}{46}$ are proper fractions.

Note: The value of proper fractions is always less than 1

IMPROPER FRACTION:

A fraction whose numerator is equal to or greater than the denominator is called improper fraction.

example : $\frac{15}{13}, \frac{13}{5}$, and $\frac{21}{14}$ are improper fractions.

Note: The value of an improper fractions is always more than as equal to 1.

Mixed Fraction:

When an improper fraction is changed to consist of a whole number and a fraction, it is called a mixed fraction.

example : The improper fraction $\frac{15}{13}$ can be written as $\frac{2}{13}$, which is a mixed fraction.

$$13\overline{)\,15}\;\;1$$
$$\underline{13}$$
$$2$$

Compound Fraction:

A fractions of a fraction is called a compound fraction.

example : $\frac{1}{3}$ of $\frac{3}{5}$ is a compound fraction.

Thus $\frac{1}{3}$ of $\frac{3}{5} = \frac{1}{3} \times \frac{3}{5} = \frac{1}{5}$

Complex Fractions:

A complex fraction is one in which the numerator or denominator or both are fractions.

example : $\frac{3/2}{5}, \frac{3}{2/5}, \frac{2/5}{3/7}$ and $\frac{1/3 + 1/2}{2/3 - 1/5}$ are complex fractions.

example 1: One third of one-seventh of a plot is sold Rs. 45000. What is the value of six-twnety fifth of the plot.

Solution: One third of one seventh $= \frac{1}{3} \times \frac{1}{7} = \frac{1}{21}$

Now, $\frac{1}{21}$ of a plot costs = Rs. 45000.

$\frac{6}{25}$ of the plot will cost $= \frac{45000}{1/2} \times \frac{6}{25}$

$= \frac{45000 \times 21 \times 6}{25}$

Example 2: A sum of money increased by its sixth part amount to Rs. 56. Find the sum.

Solution: Let x be the amount of money, thus

$$x + \frac{x}{6} = 56 \Rightarrow \frac{6x + x}{6} = 56$$

$$\Rightarrow \frac{7x}{6} = 56$$

$$\Rightarrow 7x = 56 \times 6$$

$$\Rightarrow x = \frac{56 \times 6}{7} = 48$$

VULGAR FRACTIONS

In questions of fractions signs +, −, ×, ÷, *'of'* ('of' signifies *multiplication*) and brackets are often involved. In simplifying these questions the following order must be followed:

IMPORTANT POINTS

(i) Remove the brackets.
(ii) Then quantities which are connected by *'of'* should be simplified.
(iii) Then division and multiplication are carried out.
(iv) Operation of addition and subtraction are performed at last.

Note: The above rules can be easily remembered by the word 'BODISA' of which 'B' stands for brackets, O for 'of', D for division, I for into, S for subtraction and A for addition.

Model Examples:

Example 3: $7\frac{1}{2} - \frac{1}{9}\left[3\frac{3}{4} \div \left\{\frac{5}{6} of \frac{2}{3}\left(\frac{1}{3} - \overline{\frac{1}{4} - \frac{1}{6}}\right)\right\}\right]$

Solution:

$$= 7\frac{1}{2} - \frac{1}{9}\left[\frac{15}{4} \div \left\{\frac{5}{6} of \frac{2}{3}\left(\frac{1}{3} - \frac{3-2}{12}\right)\right\}\right]$$

$$= 7\frac{1}{2} - \frac{1}{9}\left[\frac{15}{4} \div \left\{\frac{5}{6} of \frac{2}{3}\left(\frac{1}{3} - \frac{1}{12}\right)\right\}\right]$$

$$= 7\frac{1}{2} - \frac{1}{9}\left[\frac{15}{4} \div \left\{\frac{5}{6} of \frac{2}{3}\left(\frac{3}{12}\right)\right\}\right]$$

$$= 7\frac{1}{2} - \frac{1}{9}\left[\frac{15}{4} \div \left\{\frac{5}{6} of \frac{1}{6}\right\}\right]$$

$$= 7\frac{1}{2} - \frac{1}{9}\left[\frac{15}{4} \div \frac{5}{36}\right]$$

$$= 7\frac{1}{2} - \frac{1}{9}\left[\frac{15}{4} \times \frac{36}{5}\right]$$

$$= 7\frac{1}{2} - \frac{1}{9} \times 3 \times 9 = 7\frac{1}{2} - 3 = 4\frac{1}{2} \text{ Ans.}$$

Example 4: Simplify

$$\frac{\frac{1}{6} + \frac{5}{12} \times \left(\frac{4}{5} - \frac{5}{7}\right)}{\frac{3}{4} if 1\frac{2}{3} - \frac{3}{5} of 1\frac{4}{7}} \div \frac{\frac{1}{3} + \frac{1}{7} - \frac{2}{5}}{\frac{1}{5} + \frac{1}{9} - \frac{2}{7}}$$

Solution:

$$= \frac{\frac{1}{6} + \frac{5}{12} \times \left(\frac{4}{5} - \frac{5}{7}\right)}{\frac{3}{4} \times \frac{5}{3} - \frac{3}{5} \times \frac{11}{7}} \div \frac{\frac{1}{3} + \frac{1}{7} - \frac{2}{5}}{\frac{1}{5} + \frac{1}{9} - \frac{2}{7}}$$

$$= \frac{\frac{1}{6} + \frac{5}{12} \times \left(\frac{28-25}{35}\right)}{\frac{5}{4} - \frac{33}{35}} \div \frac{\frac{35+15-42}{105}}{\frac{63+35-90}{315}}$$

$$= \frac{\frac{1}{6} + \frac{1}{28}}{\frac{5}{4} - \frac{33}{35}} \div \frac{8}{105} \times \frac{315}{8}$$

$$= \frac{\frac{14+3}{84}}{\frac{175-132}{140}} \div 3 = \frac{17}{84} \times \frac{140}{43} \times \frac{1}{3}$$

$$= \frac{85}{387} \text{ Ans.}$$

Continued Fraction:

The fractions of the form $a+\cfrac{b}{c+\cfrac{d}{e+\cfrac{f}{g}}}$ etc. are known as continued fractions where *a, b, c, ...* etc., are any numbers.

Note: In order to simplify such fractions, we begin with the lowest part and proceed step by step, upwards.

Model Examples:

Example 5: Simplify:

$$\left\{1+\cfrac{1}{2+\cfrac{2}{3+\cfrac{3}{4}}}\right\}\div\left\{\cfrac{4}{4+\cfrac{4}{3+\cfrac{3}{2}}}\right\}$$

Solution:

$$\left\{1+\cfrac{1}{2+\cfrac{2}{\cfrac{15}{4}}}\right\}\div\left\{\cfrac{4}{4+\cfrac{4}{\cfrac{9}{2}}}\right\}$$

$$=\left\{1+\cfrac{1}{2+\cfrac{8}{15}}\right\}\div\left\{\cfrac{4}{4+\cfrac{8}{9}}\right\}$$

$$=1+\left\{\cfrac{1}{\cfrac{38}{15}}\right\}\div\left\{\cfrac{4}{\cfrac{44}{9}}\right\}$$

$$=\left\{1+\cfrac{15}{38}\right\}\div\left\{\cfrac{36}{44}\right\}$$

$$= \frac{53}{38} \times \frac{44}{36} = \frac{583}{342}$$ Ans.

DECIMAL FRACTION

A fraction involving decimal point is called decimal fraction.

Conversion of a decimal fraction into vulgar fraction:

Rule. Write down the given number in the numerator omitting the decimal point and for the denominator write 1 followed by as many zeroes as there are figures on the right of the decimal point.

As $46.76 = \frac{4676}{100}$

and $199.0083 = \frac{1990083}{10000}$

Multiple Choice Questions (MCQs)

Q1. If $\frac{5}{x}, \frac{8}{x}$, and $\frac{13}{x}$ are all in lowest terms. Then how many integers, x, between 30 and 40?

(A) 5 (B) 1
(C) 2 (D) 3
(D) None of these

Q2. $\frac{6}{6} \times \frac{6}{12} \times \frac{6}{18} \times \frac{6}{24} \times \frac{6}{30}$ equals:

(A) $\frac{1}{120}$ (B) $\frac{1}{2}$
(C) $\frac{1}{30}$ (D) 1
(D) None of these

Q3. If $\frac{4}{13}$ of a number is 39, what is $\frac{8}{13}$ of that number?

(A) $\frac{39}{4}$ (B) 78
(C) 16 (D) $\frac{39}{8}$

Q4. $\frac{3}{4}$ of 28 is equal to $\frac{30}{7}$ of what number?

(A) 90 (B) 45
(C) 30 (D) 56
(D) None of these

Q5. Which of the following is less than $\frac{5}{11}$?

(A) $\frac{3}{2}$ (B) $\frac{2}{3}$

(C) $\frac{1}{2}$

(D) $\frac{2}{5}$

(D) None of these

Explanatory Answers

Q1. **(D)** If x is even, then $\frac{8}{x}$ will not be in lowest term. This is because, both x and 8 are divisible by 2.

Now we take the odd number between 30 and 40, these are; 31, 33, 35, 37, 39. In these numbers, we see that 35 and 39 are divisible by 5 and 13, respectively. Thus only 31, 33 and 37 are required numbers.

Q2. **(A)** Simplifying $\frac{6}{6} \times \frac{6}{12} \times \frac{6}{18} \times \frac{6}{24} \times \frac{6}{30}$

$$\frac{1}{1} \times \frac{1}{2} \times \frac{1}{3} \times \frac{1}{4} \times \frac{1}{5} = \frac{1}{20}$$

Q3. **(B)** As $\frac{4}{13}$ of a number is 39. Therefore the $\frac{8}{13}$ of that number will be 78

Because $\frac{8}{13} = \frac{4}{13} \times 2$, and $\frac{4}{13}$ of a number is 39, therefore double of $\frac{4}{13}\left(\frac{4}{13} \times 2 = \frac{8}{13}\right)$ should be equal to $39 \times 2 = 78$.

Q4. **(A)** Let x be the required number, then by given condition

$$28 \div \frac{4}{3} = x \div \frac{30}{7}$$

$$28 \times \frac{3}{4} = x \times \frac{7}{30}$$

$$21 = x \times \frac{7}{30}$$

$$\frac{21 \times 30}{7} = x$$

$$\Rightarrow \boxed{x = 90}$$

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Chapter 6
PERCENTAGE

Percentage: The term 'percent' is a short form of the Latin word 'per centum' meaning 'out of hundred'. It can best be defined as:

"A fraction whose denominator is 100 is called a percentage and the numerator of the fraction is called the rate percent."

A rate percent is reduced to an equivalent fraction dividing it by 100.

Change of percentage into Fraction or Decimal:

To convert a percentage to a fraction, mixed number or decimal, divide it by 100, and reduce, if possible. If necessary, the relating fraction may then be changed to a decimal.

Example :

(i) Express $2\frac{1}{7}\%$ to a fraction

(ii) Change $\frac{3}{4}\%$ to a decimal.

Solution:

(i) $2\frac{1}{7}\% = \frac{15}{7}\%$

$= \frac{15}{7} \times \frac{1}{100}\left(\text{Replace } \% \text{ by } \frac{1}{100}\right)$

$= \frac{3}{140}$

$= \frac{3}{140}$

(ii) $\frac{3}{4}\% = \frac{3}{4} \times \frac{1}{100}\left(\text{Replace } \% \text{ by } \frac{1}{100}\right)$

$= \frac{3}{400} = .0075$

Change of Fraction into Percentage:

To change a fraction or a mixed numbers to a percent.

a. Multiply the fraction or mixed number by 100
b. Reduce, if possible
c. Affix a % sign.

Example 2:

(i) Change $\frac{1}{80}$ to a percent.

(ii) Change 0.05 to a percent

Solution:

(i) $\frac{1}{80} = \frac{1}{80} \times 100$

$= 1.25\%$

(ii) $0.05 = 0.05 \times 100$

$= \frac{5}{100} \times 100$

$= 5\%$

Expressing One Quantity as a Percentage of Another:

To express one quantity "p" as a percentage of another quantity "q".

a. Write p as a fraction of q. *i.e.*, $\frac{p}{q}$

b. Multiply the fraction $\frac{p}{q}$ by 100% to convert it to a percentage.

Example 3: There are 56 boys in a class of 140 students. What is the percentage of the boys?

Solution:

Total students = q = 140
Boys = p = 56

$$\text{Fraction} = \frac{p}{q}$$

$$= \frac{56}{140}$$

$$\text{Percentage} = \frac{56}{140} \times 100\%$$

$$= 40\%$$

Important Tip:
If a salary of a man is first increased by *x*% and then it has decreased *x*%, the change in its initial salary is less by *x*% of x or $\frac{x^2}{100}$.

Note:
If two values are respectively *a*% and *b*% more than a third value, then the first is $\frac{100 + a}{100 + b} \times 100$'s of the second.

Example 4: Two numbers are respectively 20% and 50% more than a third, what percentage is the first to the second?

Solution:
Following the above, we have the value

$$= \frac{100+20}{100+50} \times 100\%$$

$$= \frac{120}{150} \times 100\%$$

$$= 80\%$$

Important Tip:
If the first value is r% more than the second value, then the second is $\left[\frac{r}{100+r} \times 100\right]\%$ less than the first value.

Example 5:

If Hamza's salary is 35% more than that of Osama, then how much percent is Osama's salary less than that of Hamza?

Solution:

Following the above rules, we have the value

$$= \left[\frac{35}{100+35} \times 100\right]\%$$

$$= \left[\frac{35}{135} \times 100\right]$$

Important Tip:

If the first value is r% less than the second value, then the second is $\left[\frac{r}{100-r} \times 100\right]\%$ more than the first value.

Multiple Choice Questions (MCQs)

Q1. If the base of a rectangle is increased by 40% and its altitude is decreased by 20%, then its area is:

(A) decreased by 20%
(B) increased by 12%
(C) decreased by 12%
(D) increased by 16%

Q2. If x% of y is 20, then y =

(A) $2000x$
(B) $\frac{100}{x}$
(C) $\frac{2000}{x}$
(D) $\frac{x}{200}$

Q3. 12 is $\frac{1}{3}$% of what number?

(A) 4
(B) 400
(C) 36
(D) 3600

Q4. If p is a positive number, 400% of p is what percent of 400 p?

(A) 4
(B) 25
(C) 40
(D) 1

Q5. What is 10% of 30% of 40%?

(A) 0.12%
(B) 0.012%
(C) 12%
(D) 1.2%

Explanatory Answers

Q1. (B) If the value firstly increased by x% and then decreased by y% then there

$\left[x - y - \frac{xy}{100}\right]\%$ increase or decrease according as the sign +ve or –ve, respectively. In this problem, $x = 40$ and $y = 20$. Therefore

$$\left[40 - 20 - \frac{(40)(20)}{100}\right]\%$$

$$\left[20 - \frac{800}{100}\right]\%$$

$[20 - 8]\% = 12\%$

Because sign is +ve therefore its area is increased by 12%.

Q2. (C) $y \times \frac{x}{100} = 20$

$\Rightarrow xy = 20 \times 100 \quad \Rightarrow xy = 2000$

$\Rightarrow y = \frac{2000}{x}$

Q3. (D) Using, $\frac{\text{Part}}{\text{Whole}} = Y$ percent, here $P = 12$, $W = ?$ and Y percent $= \frac{1}{300}$

$$\frac{P}{W} = \frac{Y}{100} \quad \Rightarrow \quad \frac{P}{W} = Y \times \frac{1}{100}$$

$$\frac{12}{W} = \frac{1}{3} \times \frac{1}{100} \quad \Rightarrow \quad W = 3 \times 1200 = 3600$$

Q4. (D) 400% of $p = \frac{400}{100} \times p = 4p$, which is 1% of 400 p.

Q5. (D) 30% of 40% $= \frac{30}{100} \times \frac{40}{100} = \frac{12}{100} = 0.12$

Now 10% of 30% of 40% $= \frac{10}{100} \times 0.12 = 0.012 = 1.2\%$

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Chapter 7
RATIO & PROPORTION

RATIO: The number of times one quantity contains another quantity of the same kind is called the ratio of the two quantities.

Note: The ratio of two quantities is equivalent to the fraction that one quantity is to the other.

Example : There can be ratio between Rs. 30 and Rs. 40, but there can be no ratio between Rs. 30 and 40 apples.

Remember: The ratio 3:5 is written as 3:5 or $\frac{3}{5}$, 3 and 5 are called the terms of the ratio. 3 is the first and 5 is the second term.

Note: The first term of a ratio is called the antecedent and the second the consequent.

If a set of objects is divided into two groups in the ratio $a : b$, then the first group contains $\frac{a}{a+b}$ of the total objects. The second group contain $\frac{b}{a+b}$ of the total number of objects.

Important Example:

If a bag containing twelve mirrors is dropped, which of the following cannot be the ratio of the broken mirrors to unbroken mirrors?

(i) 2: 1 ii) 3:1 iii) 3:2 iv) 1:1 v) 7:5

Solution:

Since there are 12 mirrors is the bag. So 12 must be divisible by the sum of terms in the ratio exactly. We see that 2+1=3 divides 12 exactly 3+1=4 also divides exactly. Only the ratio 3+2=5 doesn't divide 12 exactly. Thus the correct answer is (iii)

PROPORTION:

The equality of ratios is called proportios.

example :

Consider the two ratios

1st ratio	2nd ratio
5:15	7:21

Since 5 is one-third of 15, and 7 is one-third of 21, the two ratios are equal.

Note: The first and fourth terms are called extremes, and the second and third terms, are called the means. In above example 5 and 21 are extremes, while 15 and 7 are means.

Important Points:

1. If four quantities be in proportion, the product of the extremes is equal to the product of the means.
2. Three quantities of the same kind are said to be in continued proportion when the ratio of the first to the second is equal to the ratio of the second to the third.

Aid to Memory:

The mean proportional between two numbers is equal to the square root of their product.

Example: Find

i) Fourth proportions to 5, 10, 5

ii) Third proportion of 5 and 10.

iii) Mean proportions between .04 and 0.09.

Solution:

(i) Let $5 : 10 :: 5 : x$

Then $5x = 10 \times 5 \Rightarrow 5x = 50 \Rightarrow \boxed{x = 10}$

(ii) Let $5 : 10 :: 10 : x$

Then $5x = 10 \times 10 \Rightarrow 5x = 100 \Rightarrow \boxed{x = 20}$

(iii) Mean proportion between .04 and .09

$= \sqrt{.04 \times .09} \quad = \sqrt{.0036}$

$$= \sqrt{\frac{36}{1000}} = \frac{6}{100} = 0.06$$

Direct Proportion:

If the given two quantities are so related to each other that if one of them is multiplied (or divided) by any number, the other is also multiplied (or divided) by the same number.

Inverse Proportion:

If two quantities are so related that if one of them is multiplied by any number, the other is divided by the same number.

Example :

1. If 5 balls cost Rs. 7, what do 15 balls cost?

Solution: This example is an illustration of direct proportion. Therefore, setting a proportion.

$$\therefore \quad 5 : 7 :: 15 : x$$

$$\Rightarrow 5x = 15 \times 7 \Rightarrow x = \frac{15 \times 7}{5} = 21$$

2. If 5 men can build a house in 28 days, in how many days will 10 men build it?

Solution:

This example is an illustration of inverse proportion. Here, if we increase number of men. 2, 3, 4 ..... times, the number of days will be decreased.

2, 3, 4..... times, Thus the inverse ratio of the number of men is equal to the ratio of the corresponding number of days.

$$\therefore \quad \frac{1}{15} : \frac{1}{10} :: 28 : x \text{ days}$$

$$\Rightarrow \quad x = \frac{1}{5} = \frac{1}{10} \times 28$$

$$\Rightarrow \quad x = \frac{28 \times 15}{10} = 42 \text{ days.}$$

DOUBLE RULE OF THREE:

Example : If 8 men can reap 80 hectares in 24 days, how many hectares can 36 men reap in 30 days.

Solution: We resolve this problem in two parts.

Ist Part: If 8 men can reap 80 hectors, how many hectares can 36 men reap.

Setting a proportion

8 men : 36 men : : 80 hectares : x hecter

$$x = \frac{36 \times 80}{8} = 360 \text{ hectres}$$

2nd Part: If 360 hectares can be reaped in 24 days, how many hectares can be reaped in 30 days?

24 days : 30 days = 360 hectares : x hector

$$x = \frac{360 \times 30}{24} = 450$$

SINGLE STEP:

8 men : 36 men
24 days : 30 days | : : 80 hectare : x hector

Required No. of hectares : = $\frac{\text{Multiplication of means}}{\text{Multiplication of Ist terms}}$

$= \frac{80\times36\times30}{8\times24} = 450$

Model Examples:

Example 1: Three liquids contain petrol and spirit mixed in the ratio 2 : 3, 3 : 4 and 4 : 5, respectively. A motor owner mixes 20 litres of the first, 21 litres of the second and a few litres of third. If the ratio of petrol to spirit in the mixture is 29 : 39, find the number of litres of the third liquid taken for the mixture.

Solution: 20 litres of the first liquid has $2/5 \times 20$
= 8 litres of petrol and 12 litres of spirit
21 litres of the second liquid have $3/7 \times 21$
= 9 litres of petrol and 12 litres of spirit.

Suppose x litres of the third liquid are taken, it will have $\frac{4x}{9}$ litres of petrol and $\frac{5x}{9}$ litres of spirit.

$\therefore$ Total petrol in the mixture $= 8 + 9 + \frac{4x}{9}$ litres

and total spirit $= 12 + 12 + \frac{5x}{9}$ litres.

Ratio of these $= \frac{17+\frac{4x}{9}}{24+\frac{5x}{9}} = \frac{29}{39}$

$\therefore \quad 663 + \frac{156}{9}x = 696 + \frac{145}{9}x$

or $\left(\frac{156}{9} - \frac{145}{9}\right)x = 696 - 663$

or $\frac{11}{9}x = 33$

or $x = \frac{9}{11}\times33 = 27$ litres.

Example 2: In a regiment the number of officers to men was 3:31 before the battle. In the battle, 6 officers and 22 men were killed and the ratio become 1:13. Find the number of officers and men in the regiments.

Solution: In the beginning *i.e.*, before the battle

Let no. of officers = x
" " men = y

then $x : y :: 3 : 31 \Rightarrow \frac{x}{y} = \frac{3}{31}$ .....(i)

After the battle
No. of officers = $x - 6$
" " men = $y - 22$

Then $\frac{x-6}{y-22} = \frac{1}{13}$ .....(ii)

From (i) we get $x = \frac{3}{31}y$

Substituting this value in (ii), we get

$$\frac{\frac{3}{31}y - 6}{y-22} = \frac{1}{13} \quad \text{.....(iii)}$$

Solving for y in (iii), we get

$y = 217$

$$x = \frac{3}{31} \times 217 = 21$$

∴ No. of officers = 21
No. of men = 217 } Ans.

Multiple Choice Questions (MCQs)

Q1. In a city 90% of the population own a car, 15% own a motorcycle, and everybody owns one or the other or both. What is the percentage of motorcycle owners to who own cars?

(A) 15% (B) 5%
(C) 75% (D) $33\frac{1}{3}\%$

Q2. Concrete consists of cement, sand and screenings in the ratio of 1 : 5 : 4, what is the percentage of the sand mixed?

(A) 10% (B) 40%
(C) 50% (D) 60%

Q3. Three business partners shares have profit of Rs. 24000 in the ratio 5 : 4 : 3. What is the amount of the least share?

(A) 6000 (B) 8000
(C) 10,000 (D) 1200

Q4. A machine produces 1280 parts in 16 hours. How many parts would it make in a working week of 44 hours?

(A) 2530 (B) 3520

(C) 2122 (D) 3960

Q5. If the ratio of x and y is $\frac{11}{3}$, what is the value of $2x$ to y?

(A) $\frac{11}{6}$ (B) $\frac{22}{6}$

(C) $\frac{22}{3}$ (D) $\frac{11}{5}$

Explanatory Answers

Q1. (D) Let x stand for the percentage who own both a car and a motorcycle. Then

(The %age who own a motorcycle) + (The %age who own a car) – (The %age who own one or the other or both) = 100% own one or other or both.

$\therefore \quad 15\% + 90\% - A = 100\%$

$\Rightarrow \quad 105\% - A = 100\% \Rightarrow \boxed{A = 5\%}$

The %age of motorcycle owners to who own car is

$$= \frac{5\%}{15\%} = \frac{1}{3} = \boxed{33\frac{1}{3}\%}$$

Q2. (C)

$$\text{Ratio} = 1:5:4$$

$$\text{Sum of ratio} = 1+5+4 = 10$$

$$\text{Sand} = \frac{5}{10} \times 100 = 50\%$$

Q3. (A)

$$\text{Ratio} = 5:4:3$$

$$\text{Sum of ratio} = 5+4+3 = 12$$

$$\text{least share} = \frac{3}{12} \times 24000$$

$$= \text{Rs. } 6000$$

Q4. (B) Let "x" be the number of parts in 44 hours

Then $16 : 1280 :: 44 : x$

$$\Rightarrow \quad \frac{16}{1280} = \frac{44}{x} \Rightarrow x = \frac{44 \times 1280}{16}$$

$$x = \boxed{3520}$$

Q5. (C) The ratio of x to y can be written as $\frac{x}{y}$. The ratio of x to y is $\frac{11}{3}$, which can be written as $\frac{x}{y} = \frac{11}{3}$

If $\frac{x}{y}=\frac{11}{3}$, then $2\left(\frac{x}{y}\right) = 2\left(\frac{11}{3}\right)$

$$\frac{2x}{y} = \boxed{\frac{22}{3}}$$

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Chapter 8
AVERAGE

In Mathematics, average is a representative of a number of given quantities. Average is of several kinds.

METHOD OF FINDING AVERAGE: To find average of any number of quantities of the same kind is to add all the items together and then divide the sum by the number of items.

$$\therefore \text{ Average} = \frac{\text{Sum of all the items}}{\text{No. of items}}$$

Model Examples

Example 1: The average daily temperature from 9th January to 16th January (both inclusive) was 38.6° and that from the 10th to 17th January (inclusive) was 39.2°. What was the temperature on 17th January?

Solution: Total temp. from 9th Jan. to 16th Jan.
$= 38.6 \times 8°C$
$= 308.8°C$

Since the temp. on 9th $= 34.6°C$

$\therefore$ Total temp. from 10th Jan. to 16 Jan.
$= 308.8 - 34.6$
$= 274.2°C$

Total temp. from 10 to 17th Jan.
$= 39.2 \times 8°C$
$= 313.6°C$

$\therefore$ Temp on 17th Jan. $= 313.6 - 274.2$
$= 39.4°C$

Example 2: A goods train in five successive minutes from its start runs 68 metres, 127 metres, 208 metres, 312 metres and 535 metres and for next five minutes in maintains average speed of 33 km/hr. Find the whole distance covered and the average speed of train in km/hour.

Solution: Distance covered in first five minutes.

$$= \frac{68+127+208+312+535}{1000} \text{ kms.}$$

$$= \frac{5}{4} \text{ kms.}$$

Now average speed for next five minutes
$= 33$ km/hr.

∴ Distance covered in next five minutes $= \frac{33 \times 5}{60} = \frac{11}{4}$ km

Total distance covered in 10 minutes $= \frac{5}{4} + \frac{11}{4} = \frac{16}{4}$

$= 4$ kms. Ans.

Average speed $= \frac{4}{10}$ km/min.

$= \frac{4}{10} \times 60$

$= 24$ km/hr. Ans.

Example 3: The average salary per head of all the workers of an institution is Rs. 60. The average salary per head of 12 officers is Rs. 400. The average salary per head of the rest is Rs. 56. Find the total no. of workers in the institute.

Solution: Let the total No. of workers $= x$

∴ Total salary drawn $= 60x$ .....(*i*)

Salary of 12 officers $= 12 \times 400 = 4800$ Rs.

// // // // the rest $= (x - 12) \times 56$

Hence total salary of the workers

$= (x - 12)56 + 4800$ .....(*ii*)

Equating (*i*) and (*ii*)

$60x = 4800 + 56x - 672$ $\Rightarrow 4x = 4128$

$\Rightarrow x = 1032$ Ans.

Multiple Choice Questions (MCQs)

Q1. The average of even integers from 2 to 100 inclusive is:

(A) 49 (B) 52

(C) 51 (D) 50

Q2. What is the average of first hundred natural numbers?

(A) 50 (B) 50.5

(C) 49.5 (D) 100

Q3. What is the average of x, y and z? If $x + y = 5$, $y + z = 8$ and $x + z = 11$.

(A) $\frac{11}{3}$ (B) $\frac{1}{2}$

(C) $\frac{13}{5}$ (D) 4

Q4. The average of five numbers is 54. If three of the numbers are 26, 28 and 30, what is the average of the other two?

(A) 91 (B) 93

(C) 54 (D) 186

Explanatory Answers

Q1. (C) As sum of the first n even numbers $= n(n+1)$
Now, the sum of even numbers from 2 to 100 is
$2 + 4 + 6 + 8 + \ldots\ldots + 100$ (or 50 even number)
$= 50(50+1) = 2550$

$$\text{Average} = \frac{\text{Sum of numbers}}{\text{Number of terms}}$$

$$= \frac{2550}{50} = 51$$

Q2. (B) The first 100 natural numbers are $\{1,2,3,\ldots\ldots,100\}$

Now, sum of all the first n numbers $= \frac{n(n+1)}{2}$

Sum of first 100 natural numbers $= \frac{100(100+1)}{2}$

$= 5050$

$$\text{Now, average} = \frac{\text{Sum of numbers}}{\text{Number of terms}}$$

$$= \frac{5050}{100} = 50.5$$

Shortcut: The average of first "n" natural number is $\frac{n+1}{2}$

Thus, average $= \frac{100+1}{2} = \frac{101}{2} = 50.5$

Q3. (D) Adding the given three equations:

$$(x+y) + (y+z) + (z+x) = 5 + 8 + 11$$
$$2x + 2y + 2z = 24$$
$$2(x+y+z) = 24$$

Dividing both sides by 2

$$x + y + z = 12$$

Now average of x, y and z is

$$\frac{x+y+z}{3} = \frac{12}{3} = 4$$

Q4. (B) Let the missing numbers be a and b, then by given condition,

$$\frac{a+b+26+28+30}{5} = 54$$

$$a + b + 84 = 270 \quad \text{(Multiplying both sides by 5)}$$
$$a + b = 186$$

Hence average of a and b is

$$\frac{a+b}{2} = \frac{186}{2} = 93$$

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B2 Algebra and Functions

|04 MCQs|

Chapter 1
POLYNOMIALS

Polynomial:
A sum of finite number of monomials is called a polynomial. Each monomial is called a term of the polynomial.

Monomial:
A monomial is a variable, or a constant, or a product of constant and one or more variables, with the variables having only non-negative integer in exponents.

Example :

$3x^2y$, $-5xy$, and $-7xy^3$ are monomials.

The algebraic expression

$$4y^{-3} \text{ and } \frac{3}{y}$$

are not monomials, because these expressions have not non-negative integer in exponent, and cannot be written as a product of a constant and a variable with a non-negative integer exponent.

Degree of Monomial:
In any monomial the sum of the exponents of the variables is called the degree of monomial.

Example : What are the degrees of the monomials

$$-3x^2y, 7x^3y, -18xy^2$$

Solution:
In algebraic expression $-3x^2y$, the degree of the monomial is 3, because the exponents of x and y are 2 and 1 respectively therefore their sum is $(2 + 1 = 3)$. Similarly the degree of the expressions $7x^3y$ and $-18xy^2$ are 4 and 3 respectively.

Note:
In monomial, the constant is called the numerical coefficient or simply the coefficient of the monomial. $-3x^2y$, $7x^3y$ and $-18xy^2$ are monomials of coefficient -3, 7, and -18 respectively.

Multiplication of Monomials:
The process of multiplication is illustrated in the following example:

Example : What is the value of $-5xy^2$, when $x = -2$ and $y = -3$

Solution:
First of all write the coefficient of the monomial, then substitute the value of x and y in monomial. Then evaluate:

$$-5(-2)(-3)^2 = -5(-2)(9) = 90$$

Polynomial:

A sum of a finite number of monomials is called a polynomial. Each monomial in a polynomial is called a term of the polynomial.

Degree of a Polynomial:
The degree of a polynomial is the largest degree of the terms in the polynomial.

What are like terms in a Polynomial?
Terms of polynomial that have exactly the same variables raised to the same powers are called like terms.

Remember: Only like terms in a polynomial can be combined.

Arithmetic Operations on Polynomials:
We use usual law of arithmetic, to add subtract, multiply and divide polynomials.

Addition and Subtraction:
Polynomials are added or subtracted by combining like terms.

example : $(2x^3 + 3x^2 + 7x + 6) + (4x^2 + 3x - 2) - (5x^2 + 4x)$

$= 2x^3 + (3x^2 + 4x^2 - 5x^2) + (7x + 3x - 4x) + (6 - 2)$

$= 2x^3 + 2x^2 + 6x + 4$

The rules for adding like terms are:

Rule 1:
If all the terms are positive in a polynomial, then add their coefficients.

example : Find the value of $8x^2 + 2x^2 + 7x^2$

Solution: Here we have to increase 8 like things by 2 and 7 like things of the same kind, and aggregate is 17 of each thing.

Rule 2: If all the terms in a polynomial are negative add the coefficient numerically and prefix the minus sign to the sum.

example : What is the sum of $-4x$, $-x$, $-3x$ and $-7x$

Solution: In this example the word sum indicates the aggregate of 4 subtractive quantities of like terms. In this case we have to take away successively 4, 1, 3 and 7 like things, therefore the result is the same as taking away $15(4 + 1 + 3 + 7)$ such things in the aggregate.

$\therefore$ The sum of $-4x$, $-x$, $-3x$, $-7x$ is $-15x$.

Rule 3: If all the terms have not same sign, add together separately the coefficient of all the negative terms and the coefficient of all the positive terms: Then find the difference of those two results, preceded by the sign of the greater, will give the coefficient of the sum required.

example : Find the sum of $12x^2 - 3x^2 + 15x^2 - 17x^2$

Solution: The sum of the coefficient of positive terms is $12 + 15 = 27$
The sum of the coefficient of negative terms is $3 + 17 = 20$
The difference of these is 7, and the sign of the greater is positive: hence the required sum is $7x^2$.

Multiplication of Monomials: To multiply two simple monomials together, first multiply their coefficients together and prefix their product to the product of the different letters, giving to each letter

an index equal to the sum of the indices that letter has in the separate factors.

Example : What is the product of $5x^2y^3$ and $-3xy^2$

Solution: $(5x^2y^3)(-3xy^2) = (5)(-3)(x^2 \times x)(y^3 \times y^2)$
$= -15x^3y^5$

Note: The product of a monomial by any polynomial is the algebraic sum of the partial products of each term of the polynomial by that monomial.

Multiplication of two Binomials:

The procedure of multiplication of two binomials is illustrated as:

1. Multiply each term of the first binomial by each term of the second.
2. When the terms multiplied together have like signs, prefix to the product the sign +, when unlike prefix –.
3. The algebraical sum of the partial products so formed gives the complete product.

Example : Multiply $(x + 3)$ by $(x - 5)$

Solution: $(x + 3)(x - 5) = x(x - 5) + 3(x - 5)$
$= x^2 - 5x + 3x - 15$
$= x^2 - 2x - 15$

Example : Find the value of $(x + 2)(x - 3) - (x + 4)(x - 5)$

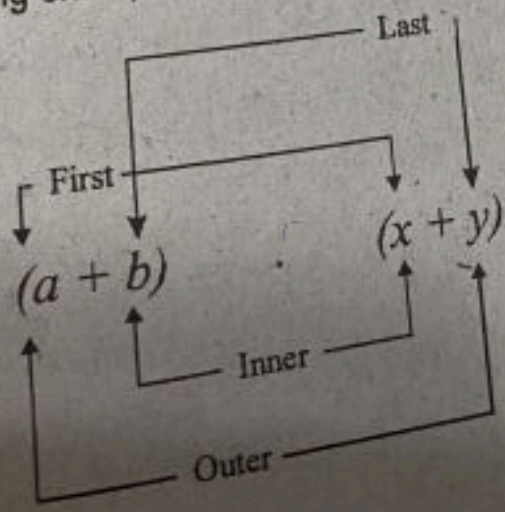
Solution: First of all, multiply both pairs of binomials separately, then subtract the second result from the first.

$(x + 2)(x - 3) = x(x - 3) + 2(x - 3) = x^2 - 3x + 2x - 6$
$= x^2 - x - 6$

$(x + 4)(x - 5) = x(x - 5) + 4(x - 5) = x^2 - 5x + 4x - 20$
$= x^2 - x - 20$

Subtracting: $(x^2 - x - 6) - (x^2 - x - 20) = x^2 - x - 6 - x^2 + x + 20$
$= 14$

FOIL Method: The product of the two binomials can be computed by the FOIL method. This method is illustrated in the following example



$$\underset{\text{term}}{\text{First}} \quad \underset{\text{term}}{\text{Outer}} \quad \underset{\text{term}}{\text{Inner}} \quad \underset{\text{term}}{\text{Outer}}$$
$$= ax + ay + bx + by$$

Example : Find the product of $(2x - 3)$ and $(4x + 2)$ using FOIL Method

First Outer Inner Last

$$(2x - 3)(4x + 2) = (2x)(4x) + (2x)(2) + (-3)(4x) + (-3)(2)$$
$$= 8x^2 + 4x - 12x - 6$$
$$= 8x^2 - 8x - 6$$

Important Binomial Formulas:

Following are most important binomial products, those occur frequently in algebra.

1. $(x + y)(x - y) = x^2 - y^2$
2. $(x + y)^2 = x^2 + 2xy + y^2$
3. $(x - y)^2 = x^2 - 2xy + y^2$

Example : Find each of the following products:

a) $(2a + 3)(2a - 3)$

b) $(a - 5b)^2$

Solution:

a) Using formula $(x + y)(x - y) = x^2 - y^2$

Here $(2a + 3)(2a - 3) = (2a)^2 - (3)^2 = 4a^2 - 9$

b) Using formula $(x - y)^2 = x^2 - 2xy + y^2$

$(a - 5b)^2 = (a)^2 - 2(a)(5b) + (5b)^2 = a^2 - 10ab + 25b^2$

Example : Given $x + y = 5$, and $x^2 - y^2 = 10$, what is the value of $x - y$?

Solution: Using the fact $(x + y)(x - y) = x^2 - y^2$

$$(5)(x - y) = 10$$
$$x - y = \frac{10}{5}$$
$$\Rightarrow \quad x - y = 2$$

Example : Find the value of xy, when $(x + y)^2 = 25$ and $x^2 + y^2 = 3$

Solution: We know $(x + y)^2 = x^2 + 2xy + y^2$

We can write $(x + y)^2 = (x^2 + y^2) + 2xy$

Substituting the value of $(x + y)^2$, and $x^2 + y^2$ in above

$$25 = (3) + 2xy$$
$$22 = 2xy$$
$$xy = \frac{22}{2}$$
$$xy = 11$$

Division of Polynomial by Monomial:

Division is the inverse of multiplication. The object of division is to find out the quantity called quotien

Thus $\frac{\text{divided}}{\text{divisor}} = \text{quotient}$

To divide a monomial by a monomial, use distributive law, the index of each letter in the quotient is obtained by subtracting the index of that letter in the divisor from that in the divided. To the result so obtained prefix its proper sign the quotient of the divided by that of divisor.
To divide a polynomial by a monomial, divide each term separately by that monomial, and take the algebraic sum of the partial quotient so obtained.

Example 1: What is the quotient when $-4x^2y$ is divided by $2x$.

Solution: The quotient $= \frac{-4x^2y}{2x} = -2xy$

Example 2: Divide $12x^3 - 6x^2 - 9x$ by $3x$

Solution: $\frac{12x^3}{3x} - \frac{6x^2}{3x} - \frac{9x}{3x} = 4x^2 - 2x - 3$

Evaluating a Polynomial:
To evaluate a polynomial, substitute the given value(s) for the variable(s) and then perform the given operation.

Example : If $x = 3$, $y = -7$ and $z = -2$, find the value of $x^2 - 26y + 17z$

Solution: $x^2 - 26y + 17z = (3)^2 - (26)(-7) + 17(-2)$
$= 9 + 182 - 34 = 157$

FACTORISING POLYNOMIALS:

Writing a polynomial as a product of polynomials of lower degree is called factoring. When each of the terms which compose a polynomial is divisible by a common factor, the polynomial may be simplified by dividing each term separately by this factor, and enclosing the quotient within brackets; the common factor being placed outside as a coefficient.

Example 1: Resolve into factors $4x^2 - 20x$

Solution: The terms of the polynomials $4x^2 - 20x$ have a common factor $4x$;
$\therefore \quad 4x^2 - 20x = 4x(x - 5)$

Example 2: Resolve into factors $x^2 - sx + tx - st$

Solution: We see that the first two terms contain a common factor x, and the last two terms a common factor t, we enclose the first two terms in one bracket, and the last in another. Thus,

$x^2 - sx + tx - st = (x^2 - sx) + (tx - st)$
$= x(x - s) + t(x - s)$; take $(x - s)$ common
$= (x - s)(x + t)$

Factorising Quadratic Trinomials: Some trinomials of the form $x^2 + bx + c$ can be factorized by trial and error procedure. This method is the reverse of the FOIL method. This is illustrated in the following example.

Example : Consider the following binomial expansion:

$$(x+5)(x+6) = x(x+6)+5(x+6)$$
$$= x^2+6x+5x+30$$
$$\therefore \quad x^2+11x+30 = (x+5)(x+6)$$

Notice at $11 = 5+6$ and $30 = 5\times 6$

This result can be used to factorize trinomials? For example, to factorize the trinomial $x^2+7x+12$ we need to find two numbers so that:

Product $= 12$ and sum $= 7$

The two numbers are 4 and 3

$4\times 3 = 12$ and $4+3=7$

$\therefore\ x^2+7x+12 = (x+4)(x+3)$

Example : Factorize *i)* $x^2+7x-18$

ii) $m^2-9m+14$

Solution:

i) $x^2+7x-18$

Product $= 9\times(-2) = -18$

Sum $= 9+(-2) = 7$

$\therefore\ x^2+7x-18 = (x+9)(x-2)$

ii) $m^2-9m+14$

Product $= (-7)(-2) = 14$

Sum $= (-7)+(-2) = -9$

$\therefore\ m^2-9m+14 = (x-7)(x-2)$

Example : Find the value of $(10001)^2$

Solution:

$$(10001)^2 = (10000+1)^2$$
$$= (10000)^2+2(10000)(1)+(1)^2$$
$$= 100000000+20000+1$$
$$= 100020001$$

Algebraic Fraction:

An expression which has a variable in the denominator, is called an algebraic expression. Algebraic fractions are added and subtracted using the same method as for arithmetic fractions. The denominator must be the same before these operations can be carried out.

Multiple Choice Questions (MCQs)

Q1. If $x = 235$ and $y = 117$, then $\dfrac{x^2-y^2}{x-y} = ?$

(A) 118 (B) 100

(C) 115 (D) 352

Q2. If $x^2-y^2 = 16$ and $x^2+y^2 = 34$, which of the following could be the value of xy?

I 15 II −15 III 45

(A) only I (B) only II
(C) I and II only (D) III only

Q3. The average of the polynomials, $2x^2 + 5x - 6$, $5x^2 - 5x - 6$ and $30 - 7x^2$ is:
(A) 14 (B) 18
(C) 6 (D) $5x$

Q4. What is the value of $x^2 + 14x + 24$, when $x = 854$?
(A) 1000 (B) 100,000
(C) 741,296 (D) 742,398

Explanatory Answers

Q1. (D) $\frac{x^2 - y^2}{x - y} = \frac{(x - y)(x + y)}{x - y} = x + y = 235 + 117 = 352$

Q2. (C) Adding both equations *i.e.*,

$$x^2 + y^2 = 34$$
$$\underline{x^2 - y^2 = 16}$$
$$2x^2 = 50 \quad \Rightarrow x^2 = 25$$
$$\Rightarrow x = \pm 25$$

Now, $x^2 + y^2 = 34 \Rightarrow 25 + y^2 = 34 \Rightarrow y^2 = 9$

$\Rightarrow y = \pm 3$

Hence, $xy = (-5)(-3) = 15 = (5)(3)$

and $xy = (-5)(3) = -15 = (5)(-3)$

So correct answer is *C*.

Q3. (C) First of all we find the sum of the three polynomials, then divide the answer by 3.

Sum of the three polynomials

$$2x^2 + 5x - 6$$
$$5x^2 - 5x - 6$$
$$\underline{-7x^2 \qquad +30}$$
$$18$$

$$\text{Now, Average} = \frac{\text{Sum of the three polynomials}}{3}$$

$$= \frac{18}{3} = 6$$

Q4. (C) To avoid time consuming calculation, factorize the given polynomial

$x^2 + 14x + 24 = x^2 + 12x + 2x + 24 = x(x + 12) + 2(x + 12)$

$= (x + 2)(x + 12)$

Substituting the value of x in above

$= (854 + 2)(854 + 12) = (856)(866)$

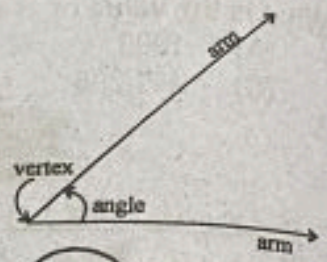
$= 741,296$

****

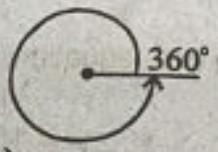
B3 Geometry

Chapter 1
LINES & ANGLES

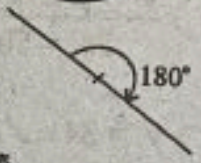
Angle:
An angle is formed by the intersection of two line segments, which may be rays or lines.
In the diagram, an angle is shown by two lines (the arms) meeting at a point. The meeting point or point of intersection is called the vertex.



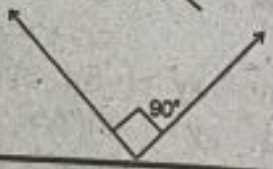
The unit of measurement of an angle is degree.
One full turn is 360 degrees (360°)



A half $\left(\frac{1}{2}\right)$ turn is 180 degrees (180°)



A $\frac{1}{4}$ turn is 90 degrees (90°).



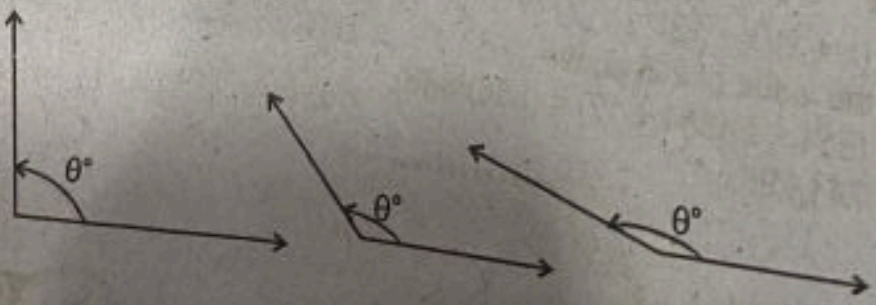
Note:
1. A half turn (180°) is also called straight angle.
2. A $\frac{1}{4}$ turn (90°) is also called a right angle.

Classification of Angles: Angles are classified according to their degree measures.
Acute Angle: An acute angle is the angle whose measure is greater than 0° and less than 90°.

$$0 < \theta < 90^\circ$$

In all above figures θ lies between 0 and 90°.
Obtuse Angle: An angle whose measure is greater than 90° and less than 180° is called obtuse angle.

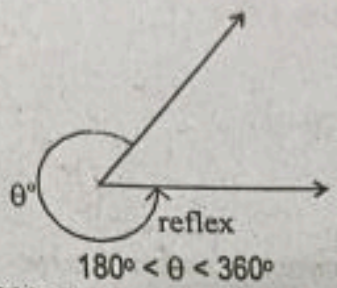
Examples



In all above figures θ lies between 90° and 180°. $90° < \theta < 180°$

Reflex Angle: A reflex angle is between 180° and 360°.

Example :

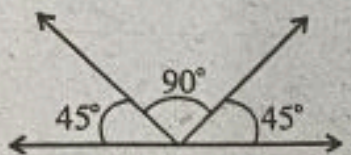


$180° < \theta < 360°$

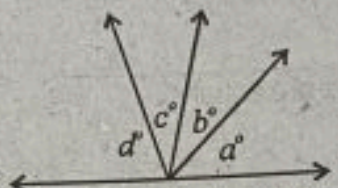
A reflex angle lies between 180° and 360° degrees.

Calculating Angles:

Angles on a straight line add up to 180°.



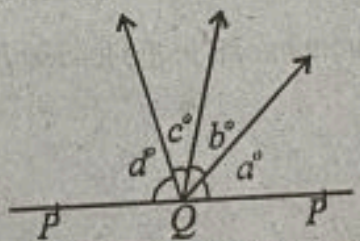
$45° + 90° + 45° = 180°$



$a° + b° + c° + d° = 180°$

A straight angle is 180°. So angles on a straight line add up to 180°.

Example 1: What is the average of *a*, *b*, *c* and *d* in the following figure



Solution: In the given figure since $\angle PQR$ is a straight angle. Because the angles on a straight line add up to 180°, therefore

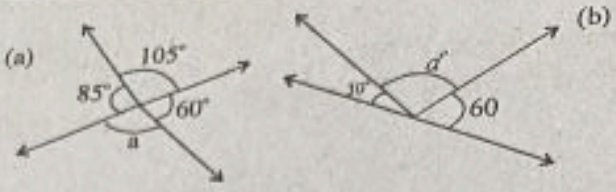
$$a + b + c + d = 180°$$

Average is

$$\frac{180°}{4} = 45°$$

Note: Angles in a full turn add upto 360°.

Example 2: Find the angle *a* in these diagrams.



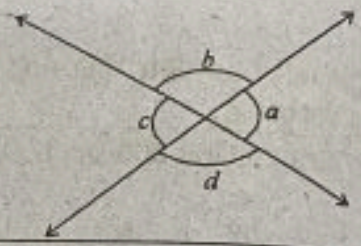
Solution:

a) $a = 360^\circ - (60^\circ + 105^\circ + 85^\circ)$
$= 360^\circ - 250^\circ$
$= 110^\circ$

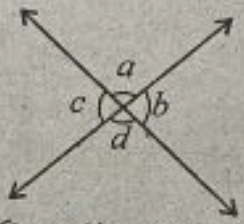
b) $a = 180^\circ - (60^\circ + 30^\circ)$
$= 180^\circ - 90^\circ$
$= 90^\circ$

Vertical Angles:

When two straight lines intersect, they make four angles. The two opposite angles are called vertical angles. In this diagram angles *a*, *c* and *b*, *d* are vertical angles.

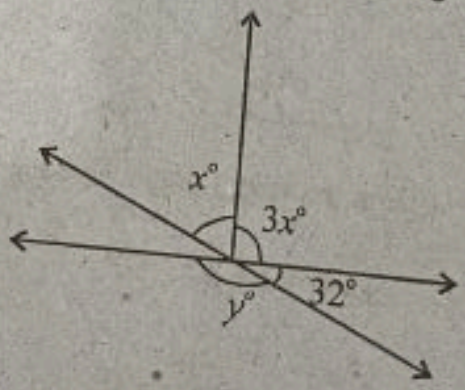


Vertically opposite angles are equal



$\angle a = \angle d$; $\angle c = \angle b$

Example 3: Find the value of pronumerals in the following diagram, giving reasons:

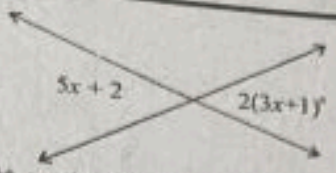


Solution: Because angles on a straight line add up to 180°, and vertically opposite angles are equal:

$\therefore \quad 3x + x + 32 = 180^\circ \Rightarrow 4x = 148 \Rightarrow x = 37^\circ$

Again $y^\circ = 3x^\circ + x^\circ \Rightarrow y = 4(37^\circ) \Rightarrow y = 148^\circ$

Example 4: What is the value of *x* in the following diagram?



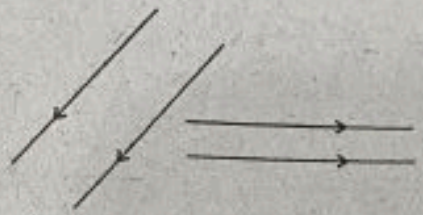
Solution: Since the vertically opposite angles are equal:

$$5x + 11 = 2(3x + 1)$$
$$5x + 11 = 6x + 2$$
$$\boxed{x = 9}$$

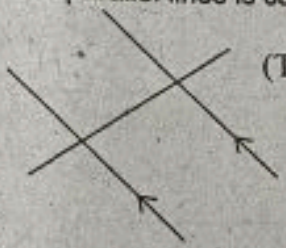
⇒

Parallel Lines:

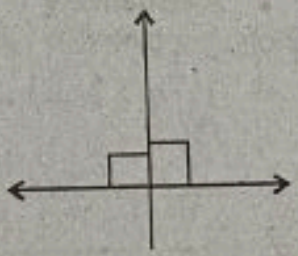
Parallel lines are always the same distance apart. They never meet, even if you make them longer. Parallel lines form no angles.



Transversal: A straight line which cuts parallel lines is called a **transversal.**

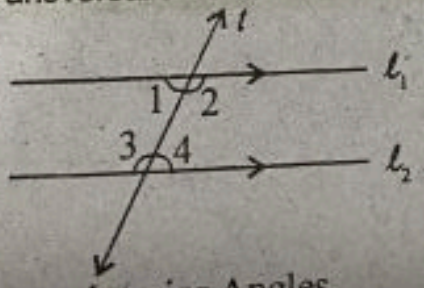


Perpendicular Lines: If two lines interest in such a way that they form right angles are called perpendicular lines

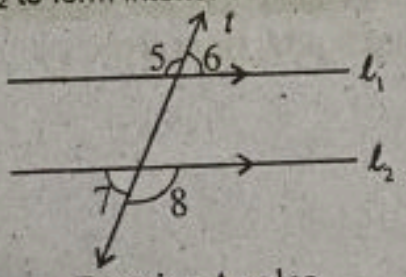


Interior Angles:

In the figure below, transversal t intersects lines l_1 and l_2 to form interior and exterior angle.

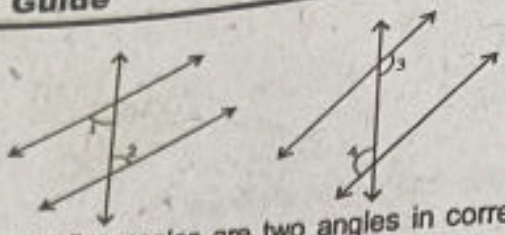


Interior Angles

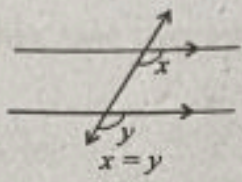


Exterior Angles

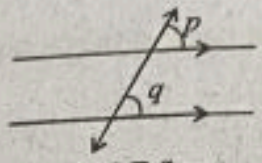
Alternate Angles: When a transversal cuts parallel lines Alternative Angles are formed. The alternative angles are equal.



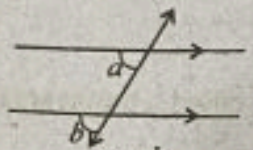
Corresponding Angles: Corresponding angles are two angles in corresponding positions relative to the two lines and the transversal. These corresponding angles are also equal. A pair of equal corresponding angles is shown below.



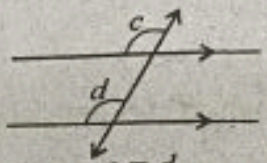
$x = y$



$p = q$

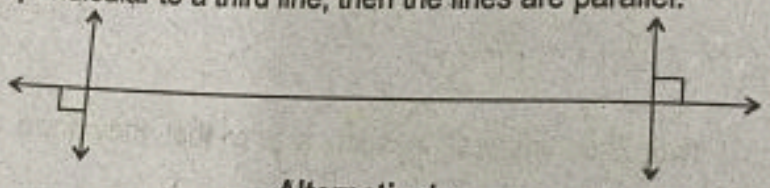


$a = b$



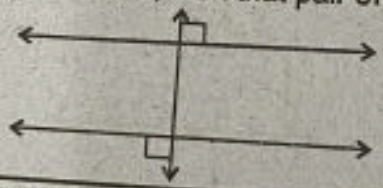
$c = d$

If two lines are both perpendicular to a third line, then the lines are parallel.



Alternatively

If a line is perpendicular to each of a pair of lines, then that pair of lines are parallel.

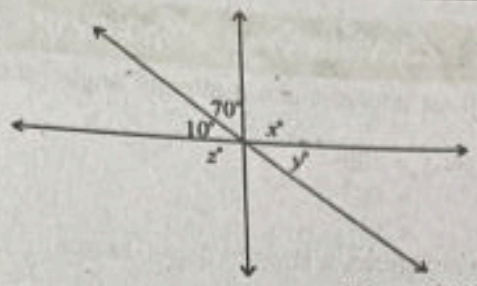


Multiple Choice Questions (MCQs)

Q1. In the following figure, what is the value of x?

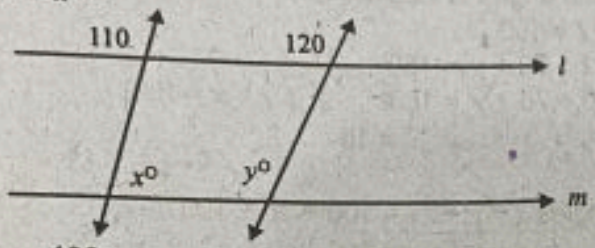
(A) 30 (B) 45
(C) 40 (D) 35

Q2. In the figure below, what is the value of $x + y + z$?



(A) 200
(B) 220
(C) 210
(D) 190

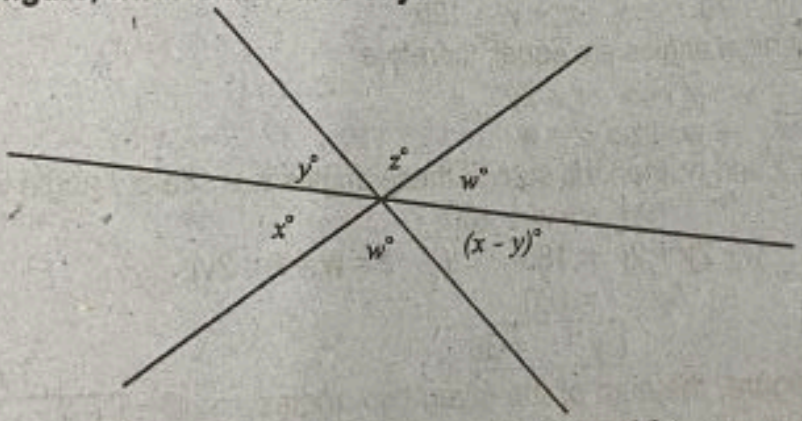
Q3. In the following figure, if $l \parallel m$



Then $x^\circ + y^\circ$ _____ 190°

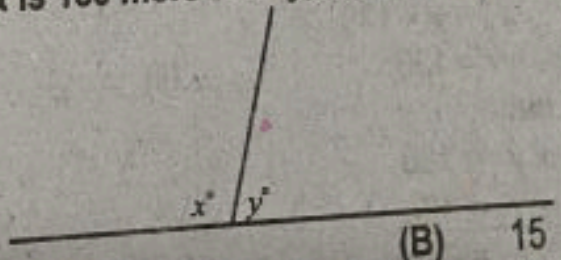
(A) =
(B) <
(C) >
(D) ≠

Q4. In the following figure, what is the value of y?



(A) 45°
(B) 36°
(C) 46°
(D) 35°

Q5. In the figure below, if x is 130 more than y, what is the value of y?



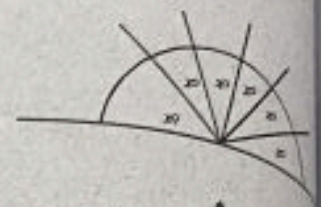
(A) 7
(B) 15
(C) 25
(D) 35

Explanatory Answers

Q1. (A) The sum of the given six angles make a straight angle, and the straight angle equal 180°

Thus

$$x^\circ + x^\circ + x^\circ + x^\circ + x^\circ + x^\circ = 180^\circ$$
$$\Rightarrow \quad 6x^\circ = 180^\circ$$
$$\Rightarrow \quad x^\circ = 30^\circ$$



Q2. (C) In the given figure, the arc shows a straight angle, hence

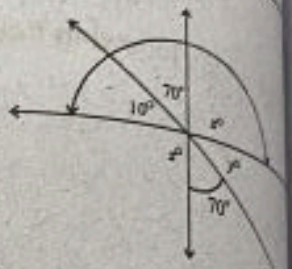
$$10 + 70 + x = 180^\circ$$
$$x = 100$$

Because opposite angles are equal, thus

$$x = z^\circ = 100 \Rightarrow z = 100$$

Similarly, $z + 70 + y = 180^\circ$

$$100 + 70 + y = 180^\circ \quad (\because z = x = 100)$$
$$\Rightarrow \quad y = 10$$

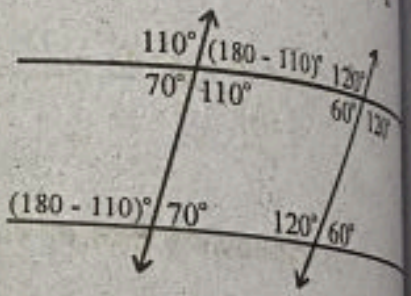


Thus,

Sum of the angles $x + y + z = 100 + 10 + 100$

$$\Rightarrow \quad \boxed{x + y + z = 210}$$

Q3. (A) Because when two straight lines intersect each other, the corresponding angles are equal. This fact is shown in the adjacent figure



Hence $x^\circ = 70$ and $y = 120$

$$x^\circ + y^\circ = 120 + 70 \Rightarrow x^\circ + y^\circ = 190$$

Q4. (B) Because vertical angles are equal, therefore

$$x - y = y \Rightarrow x = 2y$$

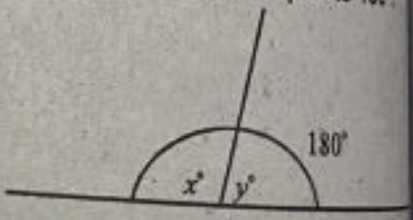
and $x = w$ also $z = w$

If we add y, z and w, then the sum of these angles is a straight angle which is equal to 180°

Thus,

$$y + z + w = 180$$
$$y + 2y + 2y = 180 \quad (\because z = w = x = 2y)$$
$$5y = 180$$
$$\Rightarrow \quad \boxed{y = 36}$$

Q5. (C) In the given figure, the sum of the given two angles x and y is a straight angle, and straight angle equals to 180, therefore



$$x + y = 180 \quad \ldots\ldots(i)$$

By given condition

$$x = y + 130$$
$$\Rightarrow \quad x - y = 130 \quad \ldots\ldots(ii)$$

Adding (i) and (ii), we have

$$x + y = 180$$
$$x - y = 130$$
$$2x = 310$$
$$\Rightarrow \quad \boxed{x = 155}$$

Substituting the value of x, in (i), we have

$$155 + y = 180$$
$$\Rightarrow \quad y = 180 - 155$$
$$\Rightarrow \quad \boxed{y = 25}$$

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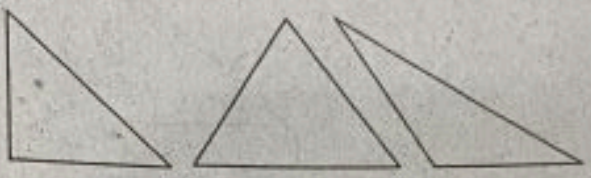
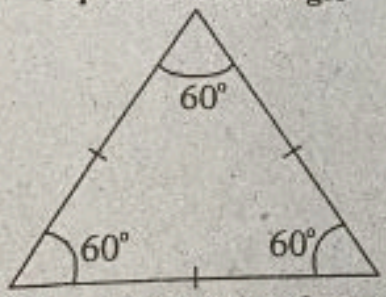
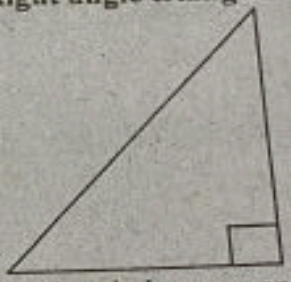
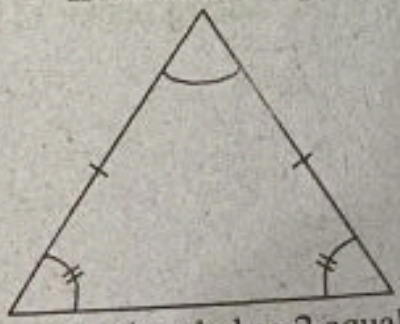
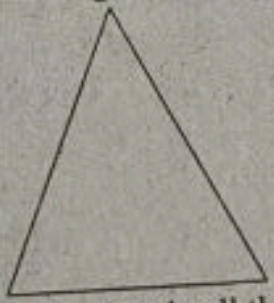
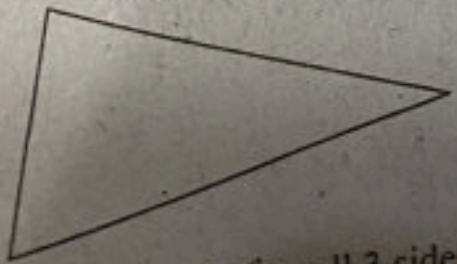
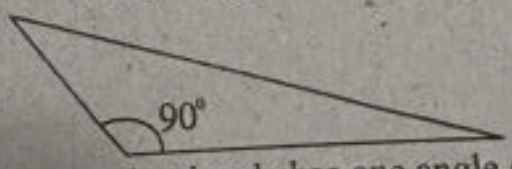
Chapter 2
TRIANGLES

Triangle:
A three-sided polygon is called a triangle.

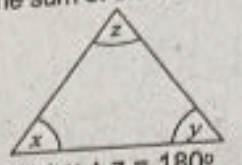


Examples

Types of Triangle:

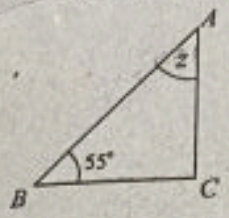
Due to side	Due to Angle
Equilateral triangle  An equilateral triangle has 3 equal sides.	**Right angle triangle**  A right angle triangle has one angle has 90°.
Isosceles triangle  An isosceles triangle has 2 equal sides.	**Acute angle triangle**  An acute angle triangle all three angles measurement are less than 90°.
Scalene triangle  A scalene triangle has all 3 sides of different lengths.	**Obtuse angle triangle**  An obtuse angle triangle has one angle greater than 90°.

Angle's Sum of Triangle: In any triangle, the sum of the measures of the three angles is 180°.



$x + y + z = 180^\circ$

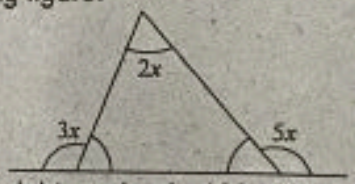
Example 1: In the figure below, what is the value of z?



Solution:
Because, the angle of a triangle add up to 180°. Therefore

$$55^\circ + 90^\circ + Z = 180^\circ$$
$$\Rightarrow \quad Z = 180^\circ - 145^\circ$$
$$\Rightarrow \quad Z = 35^\circ$$

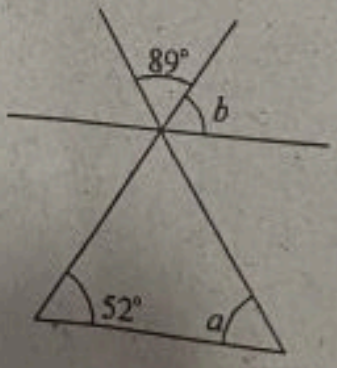
Example 2:
Calculate the value of x in the following figure:



Solution: Because the sum of the straight angles is 180°, therefore the missing angles of the triangle are $(180^\circ - 3x)$, $(180^\circ - 5x)$ and $2x$.

$$(180^\circ - 5x) + (180^\circ - 3x) + 2x = 180^\circ$$
$$360^\circ - 6x = 180^\circ$$
$$-6x = 180^\circ - 360^\circ$$
$$-6x = -180^\circ$$
$$\boxed{x = 30^\circ}$$

Example 3: Calculate the value of



Solution:
We know when two lines intersect each other then opposite angles are equal, therefore, the third angle of the triangle will be 89°. Hence

$$\angle 52^\circ + \angle a + \angle 89^\circ = 180^\circ$$
$$\angle a = 180^\circ - (52^\circ + 89^\circ)$$
$$\boxed{\angle a = 39^\circ}$$

Now, because corresponding angles are equal, here $\angle 52^\circ$ and $m\angle b$ are pair of corresponding angles. Therefore

$$m\angle b = 52^\circ$$
$$\boxed{m\angle b = 52^\circ}$$

Properties of Isosceles Triangle:

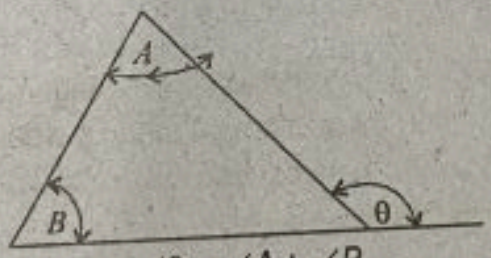
1. If two sides of a triangle are congruent, then the angles opposite to these sides are congruent.
2. If the three angles of a triangle are congruent, then the three sides are also congruent.
3. If two angles of a triangle are congruent, then the sides opposite these angles are also congruent.
4. If three sides of a triangle are congruent, then the three angles are also congruent.

Angle Properties of Triangle:

1. In every triangle the greatest angle is opposite to the longest side.
2. In every triangle the sum of the lengths of any two sides is always greater than the length of the third side.
3. In every triangle the shortest side is opposite to the smallest angle.
4. When the side of a triangle is produced the exterior angle so formed which is equal to the sum of the opposite interior angles.

example:

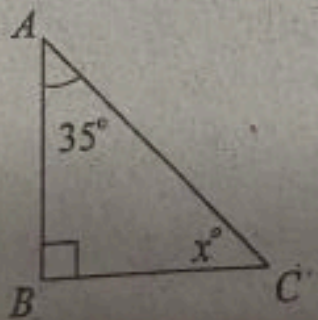
In the figure below



$$\angle\theta = \angle A + \angle B$$

5. In any right triangle, the sum of the measures of the two acute angles is 90°.

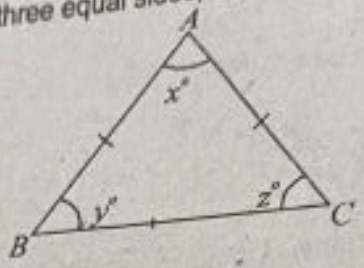
example:



Find the value of x.

Solution:
Since, the sum of the measures of the two acute angles is 90°, therefore
$x + 35^\circ = 90^\circ$
$x = 90^\circ - 35^\circ = 55^\circ$

6. An equilateral triangle has three equal sides, and three equal angles of 60°.

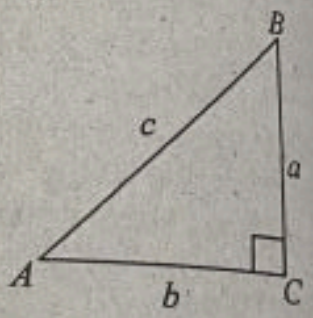


example:

The above triangle is an equilateral triangle. Therefore,
$x^\circ = y = z = 60^\circ$

Right Triangle:

1. **Pythagoras' Theorem:**
   It states that, in any right-angled triangle, the square on the hypotenuse is equal to the sum of the squares of the other two sides.
   Using the letters in the diagram, the theorem is written as
   $c^2 = a^2 + b^2$



This relation may be written as
$a^2 = c^2 - b^2$ or $b^2 = c^2 - a^2$

2. **Pythagorean Triples:**
   Pythagorean triples are sets of numbers that satisfy Pythagorean theorem.
   Let x be any positive number, then there is a right triangle whose sides are $3x$, $4x$ and $5x$.
   It mean, any multiples of this set such as $6x$, $8x$, $10x$ or $9x$, $12x$, $15x$ form a Pythagorean trip
   The most common Pythagorean triples are:

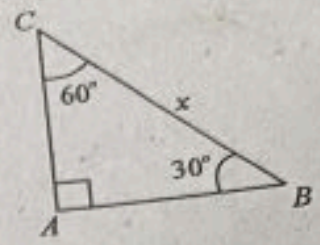
3, 4, 5
5, 12, 13
7, 24, 25

3. **The 30°–60°–90° Triangle:**

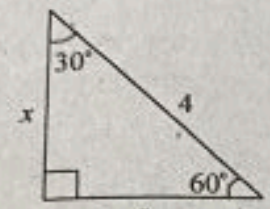
Let x be the hypotenuse of triangle ABC. Then

1) The leg opposite the 30° angle is $\frac{1}{2}(x)$. *i.e.*, $mAC = \frac{1}{2}x$

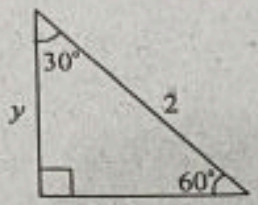
2) The leg opposite the 60° angle is $\frac{1}{2}(x)(\sqrt{3})$.



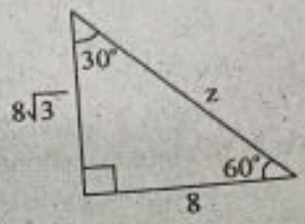
Examples



$x = 2\sqrt{3}$



$y = \sqrt{3}$



$z = 16$

Note:
In an equilateral triangle, an altitude forms a 30°–60°–90° triangle and is equal to

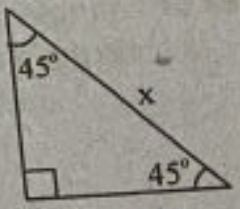
$$\frac{1}{2}(\text{hyp}).\sqrt{3}$$

4. The 45°–45°–90° Triangle:

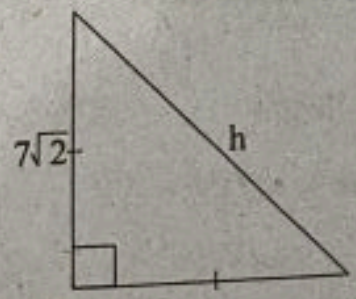
Let x be the hypotenuse of an isosceles right triangle, then

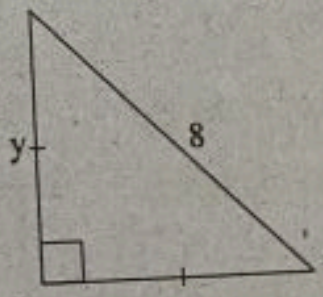
1) Each leg is $\frac{1}{2}(x).\sqrt{2}$ *i.e.*, $m\overline{AB} = m\overline{AC}$

2) Hypotenuse = leg.$\sqrt{2}$



Examples



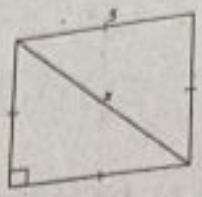


$h = (7\sqrt{2}).(\sqrt{2}) = 14$ $y = \frac{1}{2}.8.\sqrt{2} = 4\sqrt{2}$

Note:
In a square, the diagonal forms a 45°–45°–90° triangle. Thus, in a square

Diagonal = side.$\sqrt{2}$

Example :



In a square, diagonal = (Side).$\sqrt{2}$

$x = 5.\sqrt{2}$

$x = 5\sqrt{2}$

Example :

What is the area of the square whose diagonal is 12?

Solution:

Let S be the side of the square, then

Diagonal = (Side).$\sqrt{2}$

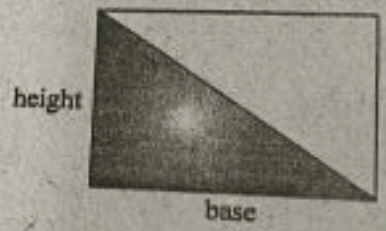
$12 = S.\sqrt{2}$

$\Rightarrow \quad S = \frac{12}{\sqrt{2}}$

Area of square $= S^2 = \left(\frac{12}{\sqrt{2}}\right)^2 = \frac{144}{2} = 72$

Area of Triangle:

To calculate the area of a triangle, first look at the following rectangle

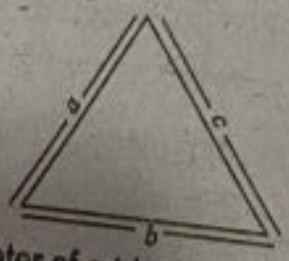


Area of rectangle = base × height

Area of triangle = $\frac{1}{2}$ × base × height

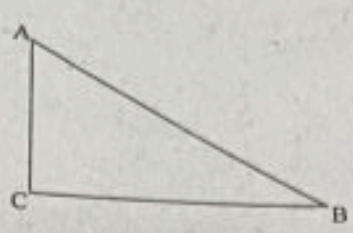
Perimeter of a triangle:

Perimeter of a triangle = sum of lengths of sides



Perimeter of a triangle = $a + b + c$

Triangle Inequality:
In $\triangle ABC$, given below



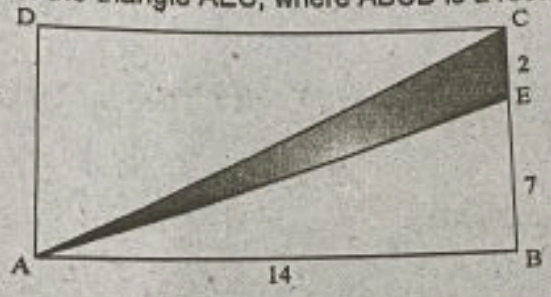
$AB > BC > AC$ and
$\angle C > \angle A > \angle B$

These inequalities suggest the following theorems.

1. The perpendicular segment from a point to a line is the shortest distance from the point to the line.
2. **Triangle Inequality Theorem:**
   The sum of the lengths of two sides of a triangle is greater than the length of the third side.

Example :

What is the area and perimeter of the triangle AEC, where ABCD is a rectangular?



Solution:

The area of Rectangle ABCD is
$= 9 \times 14 = 126$

Now area of triangle ABE

$= \frac{1}{2}(14)(7) = 49$

and area of triangle ADC

$= \frac{1}{2}(9)(14) = 63$

Total area of the triangles ABE and ADC
$= 49 + 63 = 112$

Area of $\triangle AEC$ = (Area of the rectangle) – (Sun of the area of the triangle)
$= 126 - 112$
$= 14$

Perimeter of $\triangle AEC$
In triangle ABE

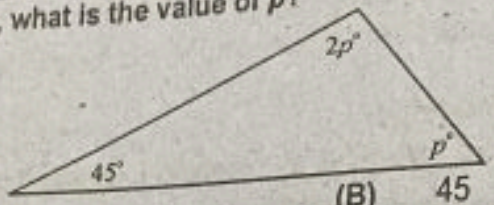
$(AE)^2 = (14)^2 + (7)^2$
$= 196 + 49 = 245 \Rightarrow AE = 7\sqrt{5} = 16$

In triangle ADC
$(AC)^2 = (AD)^2 + (BC)^2$
$= (9)^2 + (14)^2 = 81 + 196 = 277 \Rightarrow AC = 17$

Perimeter of $\triangle AEC = AE + EC + CA$
$= 16 + 17 + 2 = 35$

Multiple Choice Questions (MCQs)

Q1. In the following triangle, what is the value of p?



(A) 35 (B) 45
(C) 55 (D) 40

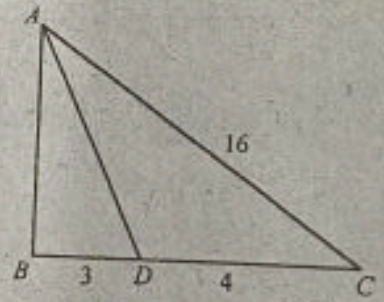
Q2. The area of an equilateral triangle whose altitude is 10, is:

(A) $8\sqrt{3}$ (B) $2\sqrt{3}$
(C) $96\sqrt{3}$ (D) $4\sqrt{3}$

Q3. The two sides of a right triangle are 3 and 5. Then the length of the third side is:

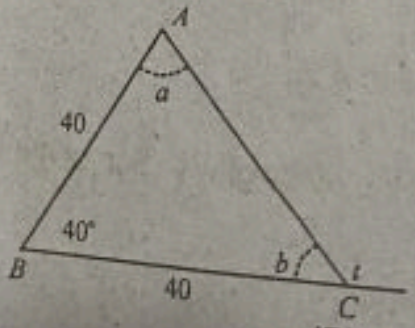
(A) $\sqrt{34}$ (B) $\sqrt{22}$
(C) $2\sqrt{3}$ (D) $3\sqrt{2}$

Q4. In the following triangle, AD =



(A) $3\sqrt{2}$ (B) $6\sqrt{6}$
(C) $6\sqrt{3}$ (D) $3\sqrt{7}$

Q5. In the following figure, t =



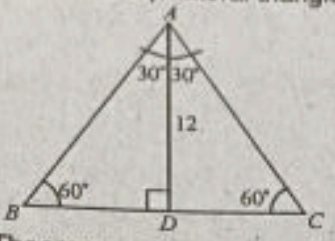
(A) 110 (B) 115
(C) 70 (D) 140

Explanatory Answers

Q1. (B) In any triangle, the sum of the angles = 180°

$\therefore \quad 45 + p + 2p = 180^\circ \Rightarrow 3p = 180 - 45 \Rightarrow p = \frac{135}{3} = 45$

Q2. (C) To find the area, first of all we draw a equilateral triangle ABC, in which AD is altitude.



By, 30 – 60 Right Triangle Theorem,

$BD = \frac{12}{\sqrt{3}} = \frac{4 \times \sqrt{3} \times \sqrt{3}}{\sqrt{3}} = 4\sqrt{3}$

Now, Base $= 4\sqrt{3} + 4\sqrt{3} = 8\sqrt{3}$ and altitude = 12

Thus, Area = Base × Altitude

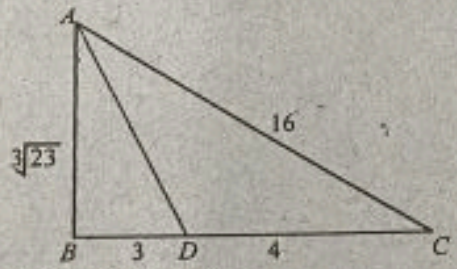
$= 8\sqrt{3} \times 12 = 96\sqrt{3}$

Q3. If the triangle is not right, then any number greater than 1 and less than 25 could be the length of the third side. Now, if the triangle is right, then there are only two possibilities:

(i) If 5 is the hypotenuse, then the legs are 4 and 3.

(ii) If 3 and 5 are two legs then hypotenuse is $\sqrt{34}$.

Q4. (B)



In ΔABC, $AC = 16$, $BC = 3 + 4 = 7$, using Pythagorean theorem, $AC^2 = (AB)^2 + BC^2 \Rightarrow 16^2 = AB^2 + 7^2$

$\Rightarrow 256 = AB^2 + 49 \Rightarrow AB^2 = 256 - 49 = 207 \Rightarrow AB = \sqrt{207}$

$\Rightarrow AB = 3\sqrt{23}$.

Now, in ΔABD, $AD^2 = AB^2 + BD^2 \Rightarrow AD^2 = (3\sqrt{23})^2 + (3)^2$

$\Rightarrow AD^2 = 9(23) + 9 \Rightarrow AD^2 = 207 + 9 \Rightarrow AD^2 = 216$

$\Rightarrow AD = 6\sqrt{6}$

Q5. (A) Here, $\angle A + \angle B + \angle C = 180 \Rightarrow a + b + 40 = 180 \Rightarrow a + b = 140$

Because the given triangle is an isosceles, *i.e.*, $a = b$

Therefore, a and b are each 70, and

$x = 180 - 70 = 110^\circ$

B4 Equations

An equation is a statement that has an equal sign. The parts of an equation to the right and left of the sign of equality are called sides of the equation and are distinguished as the right side and left side. Highest power of the variable determines the degree of the equation. The letters used for variables in an equation are called unknown quantity. The process of finding the values of variables is called solving the equation. The value so found is called the root or solution of the equation.

Linear Equation:

The equation in which the highest power of the variable is one, is called a simple or linear equation of the first degree.

Example :

$3x = 9,\ 2x + 5 = 7,\ x - 7 = 9\quad \frac{x}{2} - \frac{2}{3} = 5$ are linear equations

Axioms of Solving Linear Equation:

The process of solving linear equation depends only upon the following axioms:

1. If we add equals in an equation on both sides, the sums are equal.
2. If from equals we take equals the remainders are equal.
3. If equals are multiplied to both sides of an equation the products are equal.
4. If equals are divided by equals then the quotients are equal.

Rules of Solving Linear Equation:

We use following rules to solving a linear equation.

Rule 1:

In a linear equation, any term may be transposed from one side of the equation to the other by changing sign.

Example 1:

Consider a equation

$$-7x + 14 = -3x - 18$$

Transposing $3x + 14 = 7x - 18$

or $18 + 14 = 7x - 3x$

which is the original equation with the sign of some terms are changed.

Example 2:

Solve $3x - 8 = 16$

Solution:

The variable x is multiplied by 3 and then 8 has been subtracted

$$\boxed{x} \xrightarrow{\times 3} \boxed{3x} \xrightarrow{-8} \boxed{3x - 8}$$

Transposing the operations of "×", "−" in other words "undo" or backtrack these two operations first add 8, and then divide by 3.

$x \xleftarrow{\div} 3x \xleftarrow{+8} 3x-8$

To keep this equation balance, the same operation must be carried out on both sides of the equation. The process of solving above equation is illustrated simply in two steps as fellows:

$$\begin{aligned} 3x-8 &= 16 \\ 3x-8+8 &= 16+8 \\ 3x+3 &= 24+3 \\ x &= 8 \end{aligned}$$

Steps for Solving Linear Equations:

1. If the equation involves a fraction, first, if necessary, clear the fractions.
2. Transpose all the terms containing the unknown quantity to one side of the equation, and the known quantity to the other side of the equation.
3. Collect the terms on each side.
4. Divide both sides of the coefficient of the unknown variable.
5. Compute for the result.

Example :

Solve (i) $7x-12=3x$ (ii) $\frac{4}{x}=\frac{-1}{3}$

(iii) $\frac{3}{1+x}=\frac{1}{2}$ (iv) $\frac{4}{3+a}+1=\frac{1}{3}$

Solution:

(i) $7x-12=3x$

$7x-3x=12$

$4x=12$

$x=3$

Check

Substituting $x=3$ in equation $7x-12=3x$

$7(3)-12=3(3)$

$21-12=9$

$9=9$

Solution is correct

(ii) $\frac{4}{x}=\frac{-1}{3}$

Multiplying both sides by $3x$

$\frac{4}{x}\times 3x=\frac{-1}{3}\times 3x$

$12=-x$

$(-1)(x)+(-1)=12+(-1)$

$x=-12$

Note: $3x$ is LCD

Check

Substituting $x=-12$ in

$\frac{4}{x}=\frac{-1}{3}$

$\frac{4}{-12}=\frac{-1}{3}$

$\frac{-1}{3}=\frac{-1}{3}$

Solution is correct

(iii) $\frac{3}{1+x}=\frac{1}{2}$ **Check**

Multiplying both sides by $2(1+x)$

$$\frac{3}{1+x}\times 2(1+x)=\frac{1}{2}\times 2(1+x)$$

$$6 = 1+x$$
$$6-1 = 1+x-1$$
$$x = 5$$

Substituting $x = 5$ in

$$\frac{3}{1+5}=\frac{1}{2}$$
$$\frac{3}{6}=\frac{1}{2}$$
$$\frac{1}{2}=\frac{1}{2}$$

Solution is correct

Check

(iv) $\frac{4}{3+a}+1=\frac{1}{3}$ **Check**

Multiplying both sides by $3(3+a)$

$$\left(\frac{4}{3+a}\right)\times 3(3+a)+1\times 3(3+a)=\frac{1}{3}\times 3(3+a)$$

$$(4\times 3)+3(3+a)=3+a$$

Removing Brackets

$$12+9+3a = 3+a$$
$$21+3a = 3+a$$
$$21+3a-21-a = 3+a-21-a$$
$$2a = -18$$
$$a = -9$$

Substituting $a = -9$ in given equation

$$\frac{4}{3+(-9)}+1=\frac{1}{3}$$
$$\frac{4}{-6}+1 = \frac{4-6}{-6}$$
$$= \frac{-2}{-6}=\frac{1}{3}$$
$$\frac{1}{3}=\frac{1}{3}$$

Solution is correct

Example:

If $\frac{1}{x}=\frac{1}{y}+\frac{1}{z}$, what is the value of x?

Solution:

$$\frac{1}{x} = \frac{1}{y}+\frac{1}{z}$$
$$\frac{1}{x} = \frac{z+y}{yz}$$

Multiplying both sides by (xyz)

$$\frac{1}{x}\times xyz = \frac{(z+y)}{yz}\times xyz$$
$$\frac{yz}{y+z} = \frac{x(y+z)}{(y+z)}$$

$$x = \frac{yz}{y+z}$$

Example :

If $x = y(a + b)$, find a in terms of x, y and b.

Solution:

$$x = y(a+b)$$

$$\frac{x}{y} = \frac{y(a+b)}{y}$$

$$\frac{x}{y} - b = a + b - b$$

$$\boxed{a = \frac{x}{y} - b}$$

Solving Second-Degree Equation:

A second-degree equation involving the variable x has the generalized form

$$ax^2 + bx + c = 0$$

where a, b, and c are constants with $a \neq 0$. Second-degree equations are usually called quadratic equations. A quadratic equation in which the term containing x is missing is called a pure quadratic equation. Examples of second-degree equations are

$$2x^2 - 5x + 12 = 0$$

$$4x^2 = 16$$

$$7x^2 - 12 = 3x + 5$$

The Index Laws:

For multiplying and dividing powers, we use some rules. These rules are called index laws. These rules are summarized below:

Multiplying powers	$x^a x^b = x^{a+b}$
Dividing powers	$\frac{x^a}{x^b} = x^{a-b}$
Power of a power	$(x^a)^b = x^{ab}$
Power of a quotient	$\left(\frac{x}{y}\right)^a = \frac{x^a}{y^a}$
Power of a product	$(xy)^a = x^a y^a$
Special Index:	
Zero Index	$x^0 = 1$
Index in fraction	$x^{1/a} = \sqrt[a]{x}$
Index in negative form	$x^{-a} = \frac{1}{x^a}$

Example : Find the value of x when $27^{-2x+1} = 729^{-2x+3}$

Solution:

$$27^{-2x+1} = 729^{-x+3}$$

Take L.H.S. $27^{-2x+1} = (3^3)^{-2x+1} = 3^{3(-2x+1)} = 3^{-6x+3}$.....(1)

by Power of a power in Index law

Now take R.H.S. $729^{-x+3} = (3^6)^{-x+3} = 3^{6(-x+3)} = 3^{-12x+18}$.....(2)

comparing (1) and (2)

$$3^{-6x+3} = 3^{-12x+18}$$

$$\Rightarrow \quad -6x+3 = -12x+18$$

$$\Rightarrow \quad -6x+12x = 18-3$$

$$6x = 15 \Rightarrow x = \frac{15}{6}$$

$$\Rightarrow \quad \boxed{x = \frac{5}{2}}$$

Check:

Substitute $x = \frac{5}{2}$ in given equation

$$27^{-2\times 5/2+1} = 729^{-2\times 5/2+3}$$

$$27^{-4} = 729^{-2}$$

$$(3^3)^{-4} = (3^6)^{-2}$$

$$3^{-12} = 3^{-12}$$

Hence the solution is correct.

Systems of Linear Equations:

A system of equation is two or more equations considered together. If the equations in a system are linear, then it is called linear system of equations. The following system of the equations is a linear system of equations in two variables

$$\begin{cases} x+y=7 \\ x-y=3 \end{cases}$$

Simultaneous Equations:

A pair of equation which has two unknown, and are solved together, are called simultaneous equation. In simultaneous equations the values of unknown quantities satisfied both the given equations.

example :

$$3x+5y = 9$$

$$3x+7y = -19$$

Solution of a System of Equations:

The solution of a system of equation is an order pair that is a solution of both equations. This system of equations can be solved by following two method

(1) Substitution Method

(2) Elimination Method

(1) Substitution Method:

This method is illustrated in the following example:

Example : Solving the following system of equations using substituting method

$$3x - 4y = 2$$
$$4x + 3y = 14$$

Solution:

$$3x - 4y = 2 \quad \text{.....(1)}$$
$$4x + 3y = 14 \quad \text{.....(2)}$$

Solving equation (1) for x in terms of y

$$3x - 4y = 2 \Rightarrow 3x = 4y + 2 \Rightarrow x = \frac{4y+2}{3}$$

Substituting the value of $x = \frac{4y+2}{3}$ in (2)

$$4\left(\frac{4y+2}{3}\right) + 3y = 14 \quad \text{.....(3)}$$

To get rid of friction multiply both sides of the equation (3) by 3

$$4(4y+2) + 9y = 42$$
$$\Rightarrow 16y + 8 + 9y = 42$$
$$\Rightarrow 25y = 34$$
$$\Rightarrow \boxed{y = \frac{34}{25}}$$

To find the value of "x" substitute $y = \frac{34}{25}$, in equation (1) or (2). Here we substitute it in equation (1)

$$3x - 4\left(\frac{34}{25}\right) = 2$$
$$75x - 136 = 50$$
$$75x = 186$$
$$x = \frac{186}{75}$$
$$\boxed{x = \frac{62}{25}}$$

The solution of the equation in the form of order pair is $\left(\frac{62}{25}, \frac{34}{25}\right)$.

Elimination Method:

The process by which we get rid of either of the unknown quantities is called elimination. In this method one of the unknown is eliminated by adding or subtracting one equation from the other.

Note: Since multiplying each side of an equation by the same non-zero constant does not change the solution of the equation. Therefore, if the coefficient of the unknown are not the same size, one or both equations are first multiplied by an appropriate number.

Example 1: Solve

$x + 2y = 22$ .....(1)
$x - 2y = 2$ .....(2)

Solution:
Since y terms have equal but opposite coefficient, eliminate by adding

$x + 2y = 22$ .....(1)
$x - 2y = 2$ .....(2)
(by adding) $2x = 24$
$\boxed{x = 12}$

Substitute $x = 12$ in (1)

$12 + 2y = 22 \Rightarrow 2y = 10$
$\boxed{y = 5}$

Solution set is $(12, 5)$

Example 2: Solve $3x + 6y = 11$ .....(1)

$2x + 4y = 9$ .....(2)

Solution: In above system of equations, to eliminate the x variable. Multiplying equation (1) by 2 and equation (2) by -3. Then add the resultant equation and solve for y

$6x + 18y = 11$ .....(1)
$-6x - 12y = -27$ .....(2)
$6y = -5$
$\boxed{y = -\frac{5}{6}}$

Note: The multipliers we chosen so that the coefficient of the variables we want to eliminate are additive inverses.

Substitute $y = -\frac{5}{6}$ in (1)

$$3x + 6\left(\frac{-5}{6}\right) = 11 \Rightarrow 3x - 5 = 11 \Rightarrow 3x = 16 \Rightarrow \boxed{x = \frac{16}{3}}$$

Solution is $\left(\frac{16}{3}, -\frac{5}{6}\right)$

Example 3: What is the arithmetic mean (average) of x and y, when $3x + 4y = 21$, and $4x + 3y = 35$

Solution:

(1) + (2)

$3x + 4y = 21$ .....(1)
$4x + 3y = 35$ .....(2)
$7x + 7y = 56$

$7x + 7y = 56 \Rightarrow 7(x + y) = 56 \Rightarrow x + y = 8$

Arithmetic mean of x and y is $\frac{x+y}{2} = \frac{8}{2} = \boxed{4}$

Multiple Choice Questions (MCQs)

Q1. If $3x + 9 = 18$, what is the value of $x + 3$?
(A) 3 (B) 6
(C) -3 (D) 36

Q2. If $5x + 12 = 44$, what is the value of $5x - 12$?
(A) 24 (B) 32
(C) 20 (D) 22

Q3. If $3x + 17 = 9 - x$, what is the value of x?
(A) 2 (B) 3
(C) -2 (D) -3

Q4. If $x - 5 = 9$, what is the value of $x^2 - 5$?
(A) 196 (B) 191
(C) 16 (D) 11

Q5. If $at - b = c - dt$, what is the value of t in terms of a, b, c and d?
(A) $\frac{b-c}{a-d}$ (B) $\frac{a}{b}$
(C) $\frac{c}{d}$ (D) $\frac{b+c}{a+d}$

Explanatory Answers

Q1. (B) $3x + 9 = 18 \Rightarrow 3(x + 3) = 18$ (Taking 3 common from L.H.S)
$\Rightarrow \frac{3(x+3)}{3} = \frac{18}{3} \Rightarrow x + 3 = 6$ (Dividing both sides by 3)

Q2. (C) Given that $5x + 12 = 44$, subtracting -24 on both sides of the given equation, we have $5x + 12 - 24 = 44 - 24$
$\Rightarrow 5x - 12 = 20$

Q3. (C) $3x + 17 = 9 - x \Rightarrow 3x + x = 9 - 17$
$\Rightarrow 4x = -8$
$\Rightarrow x = \frac{-8}{4} = -2$

Q4. (B) $x - 5 = 9 \Rightarrow x - 5 + 5 = 9 + 5$ (adding 5 both sides of the equation)
$\Rightarrow x = 14 \Rightarrow x^2 = (14)^2 = 196$
Now $x^2 - 5 = 196 - 5 \Rightarrow x^2 - 5 = 191$

Q5. (D) $at - b = c - dt \Rightarrow at + dt = b + c$
$\Rightarrow t(a + d) = b + c$
$\Rightarrow t = \frac{b+c}{a+d}$

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B5 Statistics

|03 MCQs|

Miscellaneous Expected Questions for Entry Test Exams

SET-I

1. *First-hand collected data is called:*
   A Primary data B Secondary data
   C Grouped data D Ungrouped data

2. *A _____ is the totality of items or things under consideration.*
   A Sample B Population
   C Statistic D Parameter

3. *Another name of the population is:*
   A Experiment B Survey
   C Universe D Parameter

4. *Quantities which don't vary from individual to individual are called:*
   A Variables B Surveys
   C Constants D Parameters

5. *_____ is a quantity computed from a population when the entire population is available.*
   A Variables B Surveys
   C Ratio D Parameters

6. *The arrangement of data in order of magnitude is called:*
   A Order statistic B Parameter
   C Ratio D Variability

7. *A value calculated from sample is called:*
   A Parameter B Variable
   C Constant D Statistic

8. *_____ is the chance variation in an observation.*
   A Random error B Mean
   C Deviation D Discrete

9. *When statistics is applied in Economics, it is called:*
   A Psychometry B Econometrics
   C Economistics D Trigonometrics

10. *Level of satisfaction is:*
    A Continuous B Discrete
    C Population D Qualitative

11. *A sample is a representative part of a:*
    A Continuous B Discrete
    C Population D Parameter

12. *A discrete variable is also known as:*
    A Continuous B Discontinuous
    C Random Variable D Deviation

13. *Primary data and ungrouped data are:*
    A Same B Opposite
    C Not same D Proportional

14. *Statistical laws are true:*
    A On the average B In each case
    C In long run D None of these

15. *The data which have not undergone any statistical treatment are _____ data.*
    A Primary B Secondary
    C Grouped D None of these

ANSWERS

1.	A	2.	B	3.	C	4.	C	5.	D
6.	A	7.	D	8.	A	9.	B	10.	D
11.	C	12.	B	13.	C	14.	A	15.	A

SET-II

1. *The process of making tables or arranging data into rows and columns is called:*
   A Classification B Tabulation
   C Information D Arrangement

2. *The headings for different columns are called:*
   A Stubs B Source notes
   C Column captions D Footnotes

3. *The headings for different rows are called:*
   A Footnotes B Prefatory note
   C Stub D None of these

4. *The entries in different cells of columns and rows in a table are called:*
   A Body of the table B Captions
   C Stub D Prefatory notes

5. *The part of the table containing row captions is called:*
   A Stub B Row captions
   C Box-head D Row-head

6. *The part of column captions is called:*
   A Stub B Body of the column
   C Box-head D Prefatory

7. *Data are classified according to one characteristic, called:*
   A One-way classification B Tabulation
   C Single classification D Documentation

8. *The number of tally count for each value is its:*
   A Range B Frequency
   C Class boundaries D Class mark

9. *The difference between the upper and the lower class boundaries of a class is called:*
   A Class interval B Class distribution
   C Frequency D Cumulative frequency

10. *The numbers used to describe classes in a frequency distribution are called:*
    A Class limits B Relative frequency
    C Cumulative frequency D Width of class

11. *Simple bar chart is represented by:*
    A Circular region B Polygons
    C Rectangles D None of these

12. *Frequency polygon is a:*
    A Line graph B Bar graph
    C Circular graph D Rectangle graph

13. *Graph of time series is called:*
    A Sector diagram B Ogive
    C Historigram D None of these

14. *In tabulation, column captions are also called:*
    A Box-head B Body
    C Stub D None of these

15. *In tabulation, row captions are also called:*
    A Stub B Box-head
    C Body D None of these

ANSWERS

1.	B	2.	C	3.	D	4.	A	5.	A
6.	C	7.	A	8.	B	9.	A	10.	A
11.	D	12.	A	13.	C	14.	A	15.	A

SET-III

1. *The estimate of population mean μ is:*
   A Arithmetic mean B Sample mean
   C Geometric mean D Harmonic mean
2. *Sample mean is a:*
   A Constant B Parameter
   C Variable D Statistic
3. *Sample mean is denoted by:*
   A □ B μ
   C $\bar{Y}$ D □
4. *A central value is also called:*
   A Central tendency B Variability
   C Population D Parameter
5. *The sum of deviations of the values from the mean is always:*
   A Minimum B Maximum
   C One D Zero
6. *Mean is highly affected by:*
   A Even values B Odd values
   C Zero values D Extreme value
7. *The sum of squares of the deviations of the observations from their mean is:*
   A Minimum B Maximum
   C Zero D One
8. *Geometric mean of 0, 5, 1, 4, 8 is:*
   A 8 B 5
   C 2 D 1
9. *G.M becomes zero if any of the observations is:*
   A Zero B 1
   C Similar D Opposite
10. *If any value in the data set is zero, then it is not possible to compute:*
    A H.M B A.M
    C Median D Mode
11. *The most frequent value in a data set is called:*
    A Mean B Median
    C Mode D Quartile
12. *A.M is _____ affected by extreme values.*
    A Not B Highly
    C Less D None of these
13. *In symmetrical distribution, mean, median and mode are:*
    A Equal B Different
    C Zero D None of these
14. *If any value is zero, then it is impossible to calculate:*
    A H.M B Median
    C A.M D None of these
15. *A symmetrical distribution has mean equal to 4. Its mode will be:*
    A Less than 4 B Equal to 4
    C Greater than 4 D None of these

ANSWERS

1.	B	2.	D	3.	C	4.	A	5.	D
6.	D	7.	A	8.	C	9.	A	10.	A
11.	C	12.	B	13.	A	14.	A	15.	B

SET-IV

1. *The difference between the highest and lowest values in a population is called:*
   A Range B Variance
   C Mean deviation D Standard deviation
2. *The mean of the absolute deviations between the values and their median is called:*
   A Population B Standard deviation
   C Range D Mean deviation
3. *_____ is always greater than or equal to zero.*
   A Range B Standard deviation

C Mean deviation D Variance

4. *Most common measures of absolute variability are also called:*
A Range B Measures of spread
C Relative measures D Mean deviation

5. *Relative measures have no:*
A Negative values B Decimal values
C Units D Value

6. *Sum of absolute deviations are minimum if computed from:*
A Mean B Median
C Mode D Range

7. *Mean deviation is always:*
A Greater than S.D B Less than S.D
C Equal to S.D D Negative

8. *The positive square root of the variance is referred to as the:*
A Mean deviation B Quartile deviation
C Standard deviation D Range

9. *The co-efficient of variation is also called:*
A Mean deviation B Quartile deviation
C Standard deviation D Relative dispersion

10. *The co-efficient of variation is expressed as a:*
A Unit B Percentage
C Squares D Square root

11. *Mean deviation about the median is:*
A Maximum B Minimum
C Zero D 1

12. *Lack of symmetry is called:*
A Dispersion B Moment
C Skewness D Kurtosis

13. *The first moment about mean is equal to:*
A Mean B Zero
C Median D Mode

14. *The measures of dispersion are changed by a change of:*
A Origin B Scale
C Algebraic sign D None of these

15. *The variance of a constant is:*
A Constant B Zero
C One D None of these

ANSWERS

1.	A	2.	D	3.	C	4.	B	5.	C
6.	B	7.	B	8.	C	9.	D	10.	B
11.	B	12.	C	13.	B	14.	B	15.	B

SET-V

1. *The point in time at which the selected number was measured is referred to as the:*
A Index number B Base period
C Relative price index D Weighted index

2. *The index numbers are calculated in:*
A Decimal B Ratios
C Percentages D Options "A" and "B"

3. *The base period in fixed base should be:*
A A normal year B Average of normal years
C Any year D None of these

4. *Indices that involve a group of commodities are referred to as:*
A Simple indices B Common indices
C Aggregate indices D Relative indices

5. *The weighted price index is sometimes referred to as the:*
A Simple price index B Composite index

C Multi index D None of these

6. *An index number calculated for more than one items is called:*
A Composite B Simple
C Relative D None of these

7. *If all items are given equal weight, the index number is called:*
A Weighted B Unweighted
C Relative D Composite

8. *In chain base method, the base period is:*
A Fixed B Not fixed
C Constant D None of these

9. *In chain base year method, the _____ is fixed.*
A Year B Price
C Quantity D Price and quantity

10. *Link relatives are not directly comparable because they have:*
A Fixed base B Not fixed base
C Zero values D None of these

ANSWERS

1.	B	2.	C	3.	A	4.	C	5.	B
6.	A	7.	B	8.	B	9.	A	10.	B

SET-VI

1. *Most of the decisions that affect our daily lives are based upon:*
A Absolute certainty B Likelihood
C Independent D None of these

2. *A well-defined collection of distinct objects is called:*
A Probability B Chance
C Element D A set

3. *A set that contains no element is called:*
A Null set B Singleton set
C Zero set D Infinite set

4. *If a set contains a specific number of elements, then it is called:*
A Finite set B Infinite set
C Universal set D Disjoint set

5. *A set consisting of all the elements of the sets under consideration is called the:*
A Universal set B Disjoint set
C Overlapping set D Proper set

6. *A set containing only one element is called:*
A Disjoint set B Singleton set
C Universal set D Proper set

7. *Probability of an event cannot be:*
A Positive B One
C Negative D None of these

8. *When a pair of dice is rolled, the sample space consists of:*
A 6 outcomes B 36 outcomes
C 12 outcomes D 24 outcomes

9. *When each outcome of a sample space is as likely to occur as any other, the outcomes are called:*
A Mutually exclusive B Exhaustive
C Equally likely D None of these

10. *If P(B) = 0, then the conditional probability is:*
A Zero B 1
C Undefined D −1

ANSWERS

1.	B	2.	D	3.	A	4.	A	5.	A
6.	B	7.	C	8.	B	9.	A	10.	C

SET-VII

1. *A variable whose values depend upon the outcomes of a random experiment is called a:*
A Constant B Parameter
C Random variable D Continuous variable

2. *Random variable is also called:*
A Changing B Stochastic
C Chance or D None of these

stochastic

3. *The sum of probabilities of events of a sample space is always:*
A Zero B One
C Two D Infinity

4. *The height of students, between 5.0 and 5.9 feet, is an example of:*
A Discrete variable B Continuous variable
C Constant D Parameter

5. *Recording the time (minutes) taken by the customers to wait for its turns in a utility store while standing in a queue, is an example of:*
A Discrete variable B Continuous variable
C Constant D Parameter

ANSWERS

1.	C	2.	C	3.	B	4.	B	5.	B

SET-VIII

1. *The probability distribution of a discrete random variable is usually called its probability:*
A Inverse function B Mass function
C Density function D Frequency function

2. *The probability distribution of a discrete random variable is usually written with the help of a function, called its:*
A Formula B Variable
C Random variable D Discrete variable

3. *The probability density function of a continuous random variable Y is specified by a:*
A Straight line B Rectangle
C Smooth curve D Circle

4. *The probability distribution of a discrete random variable can be described with the help of a two:*
A Rows table B Column table
C Circles D Curves

5. *The area under the probability density function is:*
A 1 B 0
C Minimum D None of these

6. *The simplest form of the continuous distribution is the:*
A Discrete uniform distribution
B Probability mass function
C Density function
D Continuous uniform distribution

7. *In continuous distribution, P(y = a) and P(y = b) is always:*
A Zero B One
C Undefined D Negative

8. *The correct condition for continuous uniform distribution represented by* $f(y) = \frac{1}{(b-a)}$ *is:*
A $b < y < a$ B $a < y < b$
C $b \leq y \leq a$ D $a \leq y \leq b$

9. *The sum of probabilities of a discrete random variable is always:*
A 0 B 1
C Infinity D None of these

10. *If "a" and "b" are constants, then* $E(ax + b) =$
A a B $a\,E(x)$
C $E(x)$ D $a\,E(x) + B$

ANSWERS

1.	B	2.	A	3.	C	4.	B	5.	A
6.	D	7.	A	8.	B	9.	B	10.	D

SET-IX

1. *The shape of binomial distribution depends upon the value of its:*
A Constants B Parameters
C Variables D Integers

2. *Binomial distribution has two:*

A Variables B Constants
C Parameters D None of these

3. *The hypergeometric model is applied when samples are taken or selections are made, from a finite population:*
A With replacement B Without replacement
C With parameters D None of these

4. *The sum of probability of success and probability of failure in a binomial probability distribution is always:*
A Zero B One
C Less than 1 D Greater than 1

ANSWERS

1.	B	2.	C	3.	B	4.	B		

SET-X

Q1. The normal curve is symmetrical about an imaginary vertical line which passes through the:
A standard deviation (σ) B σ^2
C $e^{-1/2}$ D mean (μ)

Q2. Changing _____ moves a normal curve along the axis without changing its shape.
A mean (μ) B variance (σ^2)
C standard deviation D sign

Q3. Curves with larger standard deviations σ are:
A less sharply peaked B less spread out
C more sharply peaked D moved along x-axis

Q4. The total area under normal curve is:
A Infinity B unity
C zero D greater than one

Q5. The maximum ordinate of the normal probability density function at $x = \mu$ is:
A $\frac{1}{\sigma\sqrt{2\pi}} e^{\frac{x}{\sigma}}$ B $\frac{1}{\sigma\sqrt{2x}} e^{-\frac{x}{2\sigma}}$
C $\frac{1}{\sigma\sqrt{2x}}$ D $e^{\frac{x}{2\sigma}}$

Q6. In normal distribution $x_{0.75} - \mu =$
A $\mu + x_{0.25}$ B $\mu + x_{0.75}$
C $\mu - x_{0.25}$ D $x_{0.25} - \mu$

Q7. In normal probability distribution, all odd order moments about mean are:
A zero B one
C maximum D none of these

Q8. $P(\mu - \sigma < X < \mu + \sigma) =$
A 1 B 0.9973
C 8.6897 D 0.6827

Q9. $P(\mu - 3\sigma < X < \mu + 3\sigma) =$
A 0.6827 B 0
C 1 D 0.9973

Q10. In a normal probability distribution, $x_{0.5} =$
A σ B σ^2
C 1 D μ

Q11. In a normal probability distribution, $x_{0.75} =$
A $\mu + 0.9973\sigma$ B $\mu - 0.9973\sigma$
C $\mu + 6827\sigma$ D $\mu + 0.6745\sigma$

Q12. $P(\mu - 2\sigma < X < \mu + 2\sigma) =$
A 0.9545 B 0.6827μ
C 0.9973σ D none of these

Q13. In a normal distribution, Q.D(X) =
A $1/3\ \square^2$ B 0.5μ
C $2/3\ \square$ D none of these

Q14. In a normal probability distribution, M.D(X) =

A $2\sqrt{\frac{\sigma}{\pi}}$ B $\sigma\sqrt{\frac{2}{\pi}}$

C $4\sqrt{\frac{\pi}{0}}$ D $\frac{3}{2}\sigma$

Q15. The area covered by a normal curve $\mu \pm 0.6745\sigma$ covers:

A 99.45% B 96.45%

C 50% D 25%

ANSWERS

1.	D	2.	A	3.	A	4.	B	5.	C
6.	C	7.	A	8.	D	9.	D	10.	D
11.	D	12.	A	13.	C	14.	B	15.	C

SET-XI

Q1. A population consists of unlimited number of elementary units:

A Continuous population B Finite population

C Infinite population D Mix population

Q2. A sample is a part of:

A Universe B Mean

C Median D Mode

Q3. Selecting a representative sample from a given population called:

A Finite population B Sampling

C Infinite population D None of these

Q4. The collection of information from a part of the population is called making a:

A Census B Complete enumeration

C Discrete sampling D None of these

Q5. The heights of all the students enrolled at a college in a given year, is an example of:

A Infinite population B Finite population

C Discrete sampling D None of these

Q6. The results obtained by rolling a die, is an example of:

A Infinite population B Finite population

C Options A & B D None of these

Q7. A descriptive measure on the sample observation is called:

A Statistics B Statistic

C Survey D None of these

Q8. Probability sampling is also called:

A Random sampling B Discrete sampling

C Continuous sampling D Standard error

Q9. We refer the difference between the sample result and the true value as:

A Accuracy B Error

C Precision D Bias

Q10. The difference between the expected value of a statistic and the true value of the parameter being estimated is called:

A Accuracy B Error

C Precision D Bias

Q11. Bias =

A $E(T)-\theta$ B $E(T)+\theta$

C $\theta - E(T)$ D None of these

Q12. The bias is positive if:

A $E(T)>\theta$ B $E(T)>0$

C $E(T)>\theta$ D None of these

Q13. The bias is negative if:

A $E(T)>\theta$ B $E(T)<0$

C $E(T)<\theta$ D None of these

Q14. The bias is zero if:

A $E(T)<\theta$ B $E(T)=\theta$

C $E(T)=0$ D $E(T)<0$

Q15. **Bias is:**
A Non-random error
B Options A & C
C Cumulative
D None of these

ANSWERS

1.	C	2.	A	3.	B	4.	D	5.	B
6.	A	7.	B	8.	A	9.	A	10.	D
11.	A	12.	A	13.	C	14.	B	15.	C

SET-XII

Q1. **A point estimate is a single number that is used to estimate an unknown:**
A Constant
B Parameter
C Variable
D None of these

Q2. **The branch of statistics concerned with using probability concepts to deal with uncertainty in decision making is called:**
A Estimation
B Statistical Inference
C Point estimate
D None of these

Q3. **A procedure of making judgment about the unknown value of a population parameter by using the sample observations is called:**
A Statistical Inference
B Parameter
C Testing of hypothesis
D Statistical estimation

Q4. **A sample statistic that is used to estimate the unknown true value of a population parameter is called:**
A Point estimator
B Interval estimator
C Testing of hypothesis
D None of these

Q5. **Population parameters are estimated from:**
A Sample data
B Whole data
C Estimator
D Population interval

Q6. **The statistical estimation of population is divided into:**
A Two types
B Three types
C Cannot divided
D None of these

Q7. **An estimator is always a:**
A Constant
B Variable
C Parameter
D Statistic

Q8. **A specific value of an estimator computed from the sample data after the sample has been observed is called:**
A Point estimate
B Statistical Inference
C Statistic
D Parameter

Q9. **When choosing an estimator of a population parameter, one should consider:**
A Sufficiently
B Efficiency
C Options A & B
D None of these

Q10. **If an estimator T of a population parameter θ is biased, then the amount of its bias is:**
A $E(T)+\theta$
B $\mu+\theta$
C $\sigma^2+\theta$
D $E(T)-\theta$

Q11. **Which of the following is/are unbiased estimators:**
A Sample mean
B Sample proportion
C Sample variance
D All of these

Q12. **_____ is the maximum variance unbiased estimator of the population variance:**
A Estimator
B Statistic
C Sample mean
D None of these

Q13. **If $E(T)=\theta$, then this property is called:**
A Biasedness of the estimator T
B Variance σ^2

C Unbiasedness of the estimator
D None of these

Q14. An estimator T of a population parameter θ is said to be biased if:

A $E(T) > \theta$ B $E(T) < \theta$
C $E(T) \neq \theta$ D $E(T) = \theta$

Q15. If T is a biased estimator, then it will tend to give estimates:

A Far from θ B Far from t
C Near to θ D Equal to θ

ANSWERS

1.	B	2.	B	3.	D	4.	A	5.	A
6.	A	7.	D	8.	A	9.	C	10.	D
11.	D	12.	C	13.	C	14.	C	15.	A

SET-XIII

Q1. A null hypothesis is always one of status quo or:

A effected B having some difference
C having alternative hypothesis D no difference

Q2. The alternative hypothesis (H_1) is the opposite of:

A Null hypothesis B μ
C σ D H_1

Q3. The statement of the alternative hypothesis never contains $a(n)$ _____ sign regarding the specified value of the parameter.

A equal B greater than
C less than D None of these

Q4. The null hypothesis (H_o) is the hypothesis that is always:

A rejected B accepted
C zero D tested

Q5. The null hypothesis always refers to a specified value of the:

A Population parameter B Statistic
C Sample statistic D None of these

Q6. A random variable which has a normal distribution with mean $\mu = 30$ and standard deviation $\sigma = 4$ is an example of:

A Null Hypothesis B Composite Statistic
C Simple Hypothesis D None of these

Q7. The probability of a type I error is:

A Alpha B Beta
C Power curve D None of these

Q8. Rejecting a null hypothesis, when it is true, is called:

A Row scale B Simple hypothesis
C Type I error D Type II error

Q9. The normal distribution is the appropriate distribution to use in testing hypothesis about:

A A proportion, when $np_{H_o} > 5$ and $nq_{H_o} > 5$
B A mean, when σ is known and the population is normal
C A mean, when σ is unknown but n is large
D All of the above

Q10. For a particular test, $\alpha = 0.05$ and $\beta = 0.10$. The power of this test is:

A 0.15 B 0.90
C 0.85 D 0.95

Q11. For a two tailed test of hypothesis at $\alpha = 0.10$, the acceptance region is the entire region:

A To the right of the critical value
B Between the two critical values
C Outside of the two critical values

D To the left of the positive critical value

Q12. If the critical region is located equally in both tails of the sampling distribution of test statistic, the test is called a:

A Two-tailed test B One-tailed test
C Right-tailed test D Left-tailed test

Q13. If H_1 is given by $\theta < \theta_o$, we use a:

A Right-tailed test B One-sided left tail test
C Two-tailed test D None of these

Q14. If H_1 is given by $\theta > \theta_o$, we use a:

A Left-tailed test B One-sided tailed test
C Two-tailed test D None of these

Q15. If H_1 is given by $\theta = \theta_o$, we use a:

A Two-tailed test B One-sided right tail test
C One-tailed right tail test D None of these

ANSWERS

1.	D	2.	A	3.	A	4.	D	5.	A
6.	C	7.	A	8.	C	9.	D	10.	B
11.	B	12.	A	13.	B	14.	B	15.	A

SET-XIV

Q1. The two regression lines are perpendicular to each other if:

A $r = 1$ B $r = 0$
C $r = -1$ D None of these

Q2. The two regression lines are identical if:

A $r = 1$ B $x = \bar{x}, y = \bar{y}$
C $r = -1$ D A, B and C

Q3. The equations of regression lines are

$y = 0.5x + a$ $x = 0.4y + b$

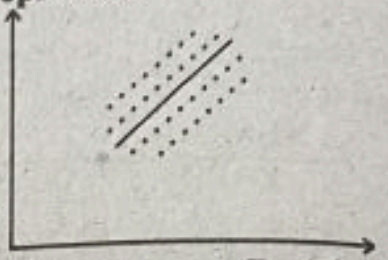
The correlation coefficient is:

A 0.45 B $\sqrt{0.2}$
C $-\sqrt{0.2}$ D $\pm\sqrt{0.2}$

Q4. If the correlation coefficient $r = 0$, the two regression lines are:

A Parallel B Perpendicular
C Coincident D Inclined at 45° to each other

Q5. The following diagram represents:



A Positive linear correlation B Negative linear correlation
C No correlation D None of these

Q6. If x and y are independent variables, then two lines of regression are:

A $x = 0, y = 0$ B $x = 0, y =$ const
C $x =$ const, $y = 0$ D $x =$ const, $y =$ const

Q7. If the sum of the product of deviations of x and y series from their means is zero, the correlation coefficient will be:

A 1 B −1
C 0 D None of these

Q8. If $r = 1$ or -1, the regression lines are:

A Parallel B Inclined at the angle <
C Perpendicular D None of these

Q9. If $r = 0$, then:

A $b_{xy} = 0$ B $b_{yx} = 0$
C both b_{yx} and b_{xy} are zero D None of these

Q10. If the equations of regression lines are $y = 0.5x + a$, $x = 0.5y + b$ and $\bar{x} = 10$, $\bar{y} = 12$, then the values of a and b are respectively:

A 7, 4 B 4, 7
C −7, −4 D None of these

Q11. If the two regression coefficients are 0.8 and 0.2, then coefficient of correlation r is:

A 0.4 B −0.4
C 1.6 D None of these

Q12. If r between the lines of regressions of x and y and y on x, is ± 1, then:

A Lines coincides B Lines are perpendicular
C There is perfect correlation between x and y D A, B and C

Q13. The purpose of simple linear regression analysis is to:

A Replace points on a scatter diagram by a straight line
B Measure the degree to which two variables are linearly associated
C Predict one variable from another variable
D None of these

ANSWERS

1.	B	2.	D	3.	B	4.	B	5.	A
6.	D	7.	C	8.	A	9.	C	10.	A
11.	A	12.	D	13.	C				

SET-XV

Q1. The process of dividing the objects into two mutually exclusive classes is called:

A Variable B Population
C Dichotomy D Frequency distribution

Q2. The Greek letters α, β, ... are used to denote the _____ of A, B, C .....

A Presence B Inverse
C Absence D None of these

Q3. If A denote that the object possesses the attribute A, then α, means:

A β B Not β
C Not α D Not A

Q4. The attributes denoted by A, B, ... are called:

A Positive attributes B Negative attributes
C Contingency attributes D None of these

Q5. The degree of relationship between the two attributes is called:

A Association B Dichotomy
C Variable D None of these

Q6. The two attributes A and B are independent, if the co-efficient of association:

A Equals to one B Equals to zero
C Not equals to zero D None of these

Q7. The classes $A\beta$, αB, etc. are called:

A Positive classes B Negative classes
C Negative of A and B D Contrary classes

Q8. If no attributes are specified, then the order of the class is:

A 0 B 1
C n D None of these

Q9. The frequency of classes of the highest order are called:

A Consistence of frequencies
B Ultimate class frequencies
C Independence of attributes
D None of these

Q10. In the study of two attributes, $n =$
A $B + \alpha$ B $(AB) + (AB)$
C $AB + (\alpha B)$ D $(A) + (\alpha)$

Q11. In the study of two attributes, $(B) =$
A $(A\beta) + (\alpha B)$ B $(AB) + (A\beta)$
C $(B) + (\beta)$ D $(AB) + (\alpha B)$

ANSWERS

1.	C	2.	C	3.	D	4.	A	5.	A
6.	A	7.	D	8.	A	9.	B	10.	D
11.	D								

SET-XVI

Q1. The _____ is a systematic component of variation in a time series.
A Historigram B Signal
C Noise D Time period

Q2. The _____ is an irregular component of variation in a time series.
A Signal B Noise
C Response D None of these

Q3. Which of the following would likely be a trend component of a time series?
A Population growth B Law suits
C Holidays D Recessions

Q4. Which of the following would likely be a seasonal component of a time series?
A Holidays B Population growth
C Law suits D None of these

Q5. The graph of the time series is called:
A Histogram B Pie chart
C Bar diagram D Historigram

Q6. A time series of annual data can contain which of the following components?
A Secular Trend B Cyclical fluctuation
C Seasonal variation D (A) and (B) only

Q7. A set of data depending on the time is called:
A Historigram B Histogram
C Time series D None of these

Q8. A _____ is a line or curve that shows the general tendency of a time series.
A Historigram B Seasonal variation
C Secular Trend D None of these

Q9. In data of birth's and death's and epidemics as a result of advancement in medical sciences, the secular trend is usually:
A a downward tendency B zero tendency
C an upward tendency D None of these

Q10. The seasonal variations are:
A Long term movements B Short term movements
C Cyclical fluctuations D Secular trend

Q11. The cyclical fluctuations are:
A Long term oscillations B Short term oscillation
C Secular oscillation D None of these

Q12. A fire in a factory delaying production for 3 weeks is an example of:
A Seasonal variation B Secular Trend
C Cyclical fluctuations D Irregular Movements

Q13. Which one of the following is an example of seasonal variation?
A An increase in consumption of electricity in summer.

B A steel strike, delaying production for a week.
C A continually increasing demand for smaller automobiles.
D None of these

Q14. **Time series analysis is used to analyze data:**
A Over different time periods
B Across different companies.
C Across different companies and across different time periods.
D That are qualitative

ANSWERS

1.	B	2.	B	3.	A	4.	A	5.	D
6.	D	7.	C	8.	C	9.	A	10.	B
11.	A	12.	D	13.	A	14.	A		

SET-XVII

Q1. **1 GHz equals to:**
A 1024 Hz B 10^4 MHz
C 10^2 MHz D 1024 MHz

Q2. **A combination of characters, numbers and symbols for specific purpose is called:**
A Bytes B Data
C MB D None of these

Q3. **Number of instructions processed in one second is called _____ of computer.**
A Accuracy B Speed
C Frequency D None of these

Q4. **_____ is a measure of number of vibration per second.**
A Frequency B Speed
C Hertz D Bytes

Q5. **The number of pulses generated in one second is called _____.**
A Accuracy B Frequency
C Hertz D Data

Q6. **The unit of frequency is:**
A Hertz B Bytes
C Mega bytes D None of these

Q7. **The main function of a computer is:**
A Data storage B Speed
C Data processing D None of these

Q8. **Computer means:**
A Complete B Processing
C Data D Calculate

Q9. **The CPU of a digital computer consists of:**
A ALU B Main memory
C Control unit D All of the above

Q10. **A collection of eight bits is called:**
A Byte B Word
C Record D File

Q11. **Computer memory:**
A Performs all calculations
B Receives input data
C is extremely limited
D is better than human memory

Q12. **A computer stores instructions in:**
A English language
B Octal Number System
C Binary Number System
D Decimal Number System

Q13. **A computer can execute:**
A a flow chart B a program
C an algorithm D all of the above

Q14. **"Pascaline" was modified by _____ in 1671.**
A Baron Gottfried Wilhelm von Leibnitz
B Charles Babbage
C Blaise Pascal
D John von Neumann

ANSWERS

1.	D	2.	B	3.	B	4.	C	5.	B
6.	A	7.	C	8.	D	9.	D	10.	A
11.	C	12.	C	13.	B	14.	A		

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B6 Scenario Based/ Mental Mathematics

|06 MCQs|

Miscellaneous Expected Questions for Entry Test Exams

TEST NO.1

1. In the exam, 75% of the candidates passed in English and 65% in Mathematics, while 15% failed both in English as well as in Mathematics. If 495 candidates passed in both the subjects, find the total number of candidates who took the examination.
   (A) 800 (B) 900✓
   (C) 850 (D) 950
2. A camera was sold at a loss of 10 per cent. If it was sold for Rs. 70 more, there could have been a gain of four per cent. The camera was sold for:
   (A) Rs. 400 (B) Rs. 350
   (C) Rs. 450✓ (D) Rs. 250
3. A fort is provisioned for 75 days. After 25 days, a reinforcement of 500 men arrive and the food then lasts only 40 days. How many men were there in the fort?
   (A) 2,000 men✓ (B) 3,000 men
   (C) 1,500 men (D) 2,500 men
4. How much per cent must be added to the cost price of goods so that a profit of 20% must be made after throwing off a discount of 10% from the labelled price?
   (A) 35% (B) 40%
   (C) 33 ½ %✓ (D) 30%
5. A train having 110 m length runs through a station at the rate of 36 km per hour. How long will it take to pass a given point?
   (A) 15 sec (B) 20 sec
   (C) 22 sec (D) 11 sec✓
6. If mangoes be bought at the rate of 14 for a rupee. How many must be sold for a rupee to gain 40 per cent profit?
   (A) 9 (B) 10✓
   (C) 15 (D) 12
7. Aluminium bronze consists of copper and aluminium, usually in the ratio of 10:1 by weight. If an object made of this alloy weighs 77 lb; how many pounds of aluminium does it contain?
   (A) 7.2 (B) 7.0✓
   (C) 7.7 (D) 70.7
8. 2 dozen cans of dog food at the rate of 3 cans for Rs. 1.45 would cost:
   (A) Rs. 11.60✓ (B) Rs. 10.20
   (C) Rs. 11.20 (D) Rs. 10.50
9. Two cars start towards each other from points 400 miles apart. One car travels at 40 miles an hour and the other travels at 35 miles an hour. How far apart, in miles, will the two cars be after 4 hours of continuous travelling?
   (A) 50 (B) 75
   (C) 100✓ (D) 70

10. 16 ounces of fresh orange juice contains 216 calories, and 16 ounces of fresh grapefruit juice contains 174 calories. If an 8 ounce mixture of these two juices contain 94 calories, what fraction of the mixture is orange juice?
(A) $^1/_3$✓ (B) $^2/_3$
(C) $^1/_2$ (D) $^{47}/_{54}$

11. On selling 70 quintals of rice, one loses the selling price of 14 quintals. Find the loss percentage.
(A) 15% (B) 20%
(C) 12% (D) $16\,^2/_3\%$✓

12. A car does a journey in 10 hrs. The first half at 21 km per hour and the rest at $2\,^4/_5$ km per hour. Find the distance.
(A) 250 km (B) 224 km✓
(C) 200 km (D) 225 km

13. The ratio of 24 to 64 is:
(A) 1:24 (B) 3:5
(C) 1:64 (D) 3:8✓

14. If 3 men or 6 boys can do a work in 20 days, how many days will 6 men and 8 boys take to do the same work?
(A) 10 (B) 12
(C) 6✓ (D) 5

15. In what proportion must a man mix milk at Rs. 11 a litre with milk at Rs. 6 a litre, so that the mixture may be worth Rs. 8 a litre?
(A) 2:3✓ (B) 5:6
(C) 5:2 (D) 3:2

16. The rent of a flat is Rs. 250 per month, the house tax is to be charged 10 per cent yearly, but 12 per cent of the rent is deducted for repairs and other expenses. The house tax is:
(A) Rs. 364 (B) Rs. 310
(C) Rs. 384 (D) Rs. 264✓

17. The average age of a class of 50 boys which is 12.9 years is raised to 13 years by coming of a new boy. The age of the new boy is:
(A) 19 years (B) 20 years
(C) 18 years✓ (D) 17 years

18. You started from a place and went 4 kilometres north and turned left and moved 2 kilometres west. Then you again turned left and moved 4 kilometres. How many kilometres are you from the place you started?
(A) 6 km (B) 2 km✓
(C) 4 km (D) 10 km

19. A, B, C are employed to do a piece of work for Rs. 529. A and B together are supposed to do 19/23 of the work. What should C be paid?
(A) Rs. 234 (B) Rs. 82
(C) Rs. 100 (D) Rs. 92✓

20. The volume of a wooden block is 280 cm^3. What is its height if the length is 8 cm and the breadth is 5 cm?
(A) 7 cm✓ (B) 14 cm
(C) 9 cm (D) 10 cm

21. The number that is one hundredth less than 9.5 is:
(A) 9.51 (B) 9.49✓
(C) 9.40 (D) 10.50

22. A manufacturer sells goods to a dealer and later to his customers each at the same rate of profit of 10%. How much percent does a customer pay above the original cost of goods purchased by him for Rs. 605?
(A) 24% (B) 20%
(C) 21%✓ (D) 23%

23. Two vessels contain milk and water mixed respectively in the ratio 3:1 and 5:3. Find the ratio in which these are to be mixed to get a new mixture in the ratio of milk and water 2:1.
(A) 2:1✓ (B) 2:3

(C) 2:5 (D) 1:2

24. A man travelled a distance of 61 km in 9 hours, partly on foot at the rate of 4 km per hour and partly by bicycle at 9 km per hour. The distance travelled on foot is:
(A) 25 km (B) 46 km
(C) 16 km✓ (D) 20 km

25. If 15 men can do a piece of work in 20 days, in how many days can 25 men finish the same work?
(A) 16 (B) 15
(C) 8 (D) 12✓

TEST NO. 2

1. Adil estimates that he can paint a house in 5 days by using 6 men. If he actually uses only 5 men for the job, how many days will they take to paint the house?
(A) 6 (B) 5½
(C) 5 (D) 6½✓

2. Find the fraction which becomes $^1/_2$ when 1 is added to its denominator and $^1/_3$ when 2 is subtracted from its numerator.
(A) $^5/_6$ (B) $^3/_8$
(C) $^5/_9$✓ (D) $^2/_5$

3. If a family of 9 persons spends Rs. 4800 in 8 months, how much will be spent by a family of 24 persons in 16 months?
(A) Rs. 25,600✓ (B) Rs. 25,000
(C) Rs. 26,000 (D) Rs. 26,600

4. Men's white handkerchiefs cost Rs. 2.29 for 3. The cost per dozen handkerchiefs is:
(A) Rs. 6.87 (B) Rs. 9.16✓
(C) Rs. 8.16 (D) Rs. 13.75

5. Sadia has m minutes of homework in each of her s subjects. What part of her homework does she complete in an hour?
(A) $^{60m}/_s$ (B) $^{ms}/_{60}$
(C) $^{60}/_s$✓ (D) $^1/_{ms}$

6. The average marks obtained by ... candidates in an exam...nation is 45. The average of the first ten is 56, while that of the last eleven is 40. The marks obtained by the 11 candidates are:
(A) 0✓ (B) 4
(C) 3 (D) 9

7. Rs. 49 were divided among 150 children, each girl has 50 paisa and each boy 25 paisa. How many boys were there?
(A) 106 (B) 104✓
(C) 50 (D) 100

8. A club decided to build a cabin. The job can be done by 3 skilled workmen in 20 days or by 5 of the boys in 30 days. How many days will the job take if all work together?
(A) 10 (B) 14
(C) 8 (D) 12✓

9. It costs 31 paisa a square foot to lay vinyl flooring. To lay 180 square feet of flooring, it will cost:
(A) Rs. 55.80✓ (B) Rs. 62.00
(C) Rs. 18.60 (D) Rs. 50.90

10. If the price of the coal be raised by 10%, by how much percentage a man must reduce its consumption so as not to increase his expenditure?
(A) 9 ½ % (B) 9 ¼ %✓
(C) 10% (D) 9%

11. A man says to his son, seven years ago I was 7 times as old as you were and 3 times hence I will be as old as you are. Find their ages.
(A) 52, 21 (B) 42, 12
(C) 51, 21✓ (D) 51, 12

12. Ali can dig a lawn in 20 minutes, while Abid takes 10 minutes longer to dig the same lawn. How long will they take to dig the lawn if they work

together?
(A) 14 min (B) 12 min✓
(C) 10 min (D) 12 ½ min

13. The actual length represented by 3 $^{1}/_{2}$ inches on a drawing having a scale of $^{1}/_{8}$ inches to the foot is:
(A) 50 ft (B) 28 ft
(C) 110 ft (D) 120 ft✓

14. If after 24% wastage, the net output of a coal mine is 60,800 tonnes, then what is the gross output of the mine?
(A) 70,000 tonnes (B) 75,830 tonnes
(C) 80,000 tonnes✓ (D) 85,330 tonnes

15. Akram can do a work in r days and Shahid who works faster, can do the same work in s days. The number of days the two of them would take to do the work if they worked together?
(A) $^{rs}/_{r+s}$✓ (B) $^{1}/_{r}+^{1}/_{s}$
(C) $^{r+s}/_{2}$ (D) r+s

16. The average weight of 5 men is increased by 1 kg when one of them whose weight is 60 kg is replaced by a new man. What is the weight of the man?
(A) 67 kg (B) 50 kg
(C) 65 kg✓ (D) 55 kg

17. A man made a profit of 8% by selling an article for Rs. 540. What profit would he make if he sells the article for Rs. 600?
(A) 12% (B) 20%✓
(C) 12 ½ % (D) 25%

18. A flask can hold 0.6 litre. How many flasks are necessary to hold 3.6 litres?
(A) 4 (B) 12
(C) 3 (D) 6✓

19. Jamil can wire x radios in 3/4 minute. At this ratio, how many radios can he wire in 3/4 of an hour?
(A) $^{60}/_{x}$ (B) 60
(C) 60x✓ (D) $^{x}/_{60}$

20. A medical student has to secure 40% marks to pass. He gets 40 and fails by 40 marks. Find the maximum marks?
(A) 200✓ (B) 150
(C) 175 (D) 80

21. Sana can type a script in 10 hours. Kiran can type the same script in 5 hours. If they type this script together, it can by completed in:
(A) 2 hrs. (B) 3 hrs.
(C) 3 hrs. 20 min✓ (D) 5 hrs.

22. Three times the first of three consecutive odd integers is 3 more than twice the third. Find 3rd integer.
(A) 15✓ (B) 11
(C) 9 (D) 13

23. If M men can complete a job in H hours, how long will 5 men take to do this job?
(A) $^{5H}/_{m}$ (B) $^{MH}/_{5}$✓
(C) $^{5}/_{MH}$ (D) $^{5M}/_{H}$

24. Three boys have marbles in the ratio of 19:5:3. If the boy with the least number has 9 marbles, how many marbles does the boy with the greatest number have?
(A) 81 (B) 27
(C) 57✓ (D) 23

25. If 10% decrease in the price of sugar means Rs. 4.50 per kg, then what is the price when the original price is increased by 10% ?
(A) Rs. 4.00 (B) Rs. 5.00
(C) Rs. 6.00 (D) Rs. 5.50✓

TEST NO. 3

1. Snow is accumulating f feet per minute. How much snow will

accumulate in h hours if it continues falling at the same rate?
(A) 60 f h✓ (B) $^{60f}/_{h}$
(C) $^{f}/_{h}$ (D) $^{60}/_{f}$

2. Estimates of electricity generation during 1973-74 and 1975-76 are 200 and 245, respectively. Determine the percentage increase in the estimated electricity generation in 1975-76 over 1973-74.
(A) 17.9 (B) 25.2
(C) 20 (D) 22.5✓

3. Nazir can wash his car in 15 minutes, while his son takes twice as long to do the same job. If they work together, how many minutes will the job take then?
(A) 5 (B) 15
(C) 10✓ (D) 20

4. A diagram of a plane drawn to the scale of 0.5 inch equals 80 feet. If the length of the diagram is 4.5 inches, the actual length of the plane is:
(A) 640 ft (B) 720 ft✓
(C) 680 ft (D) 360 ft

5. The average age of 600 students of a class is 10.75; by enrollment of 40 new students, the average age is lowered to 10.4375 years. Find the average age of the new students.
(A) 5.50 years (B) 5.15 years
(C) 6 years (D) 5.75 years✓

6. Five pencils cost as much as 3 pens, 20 pens as much as 4 letter pads, 5 letter pads as much as 2 knives. If 6 knives cost Rs. 2.50, find the cost of 1 pencil.
(A) Re. 0.10 (B) Re. 0.02✓
(C) Re. 0.50 (D) Rs. 0.20

7. At 13° centigrade, a cubic centimetre of uranium weighs 18.7 grams. What is the weight (in grams) of 0.1 cubic centimetre of uranium at 13° centigrade?
(A) 1.87✓ (B) 0.187
(C) 1870 (D) 100

8. Two whole numbers are such that their sum is 6. Also if twice the smaller number is subtracted from the bigger number, the rest zero is got. Find the smaller number.
(A) 3 (B) 4
(C) 2✓ (D) 0

9. How many ounces of pure acid must be added to 20 ounces of a solution that is 5% acid to strengthen it to a solution that is 24% acid?
(A) 6 (B) 5✓
(C) 2 ½ (D) 10

10. A man works 5 days a week and binds 35 sets of books each week. If there are 7 books in a set, what is the number of books he binds each day?
(A) 25 (B) 50
(C) 35 (D) 49✓

11. A man buys oranges at the rate of 6 for 5 p and sells them at the rate of 5 for 6 p. How much does he gain in per cent?
(A) 42% (B) 46%
(C) 44%✓ (D) 43%

12. Farid thinks of a number, doubles it, adds 7, multiplies it by 4 and then divides it by 6 to give the final answer 10. What was the number?
(A) 4✓ (B) 6
(C) 2 (D) 5

13. If the cost of 500 articles is r rupees, how many of these articles can be bought for x rupees?
(A) $^{rx}/_{500}$ (B) $^{500}/_{rx}$
(C) $^{500r}/_{x}$ (D) $^{500x}/_{r}$✓

14. A person sold 60 metres of cloth for Rs. 138, gaining thereby the cost of 9 metrs. Find his gain per cent.
(A) 20% (B) 15%✓

(C) 10% (D) 25%

15. Find the cost of polishing the total surface of a prism 5 metres high on a square base with one side 1.5 metres at 40 paisa per square metre.
(A) Rs. 13.80✓ (B) Rs. 14.30
(C) Rs. 17.40 (D) Rs. 11.20

16. If a light flashes every 6 seconds, how many times will it flash in $^{3}/_{4}$ of an hour?
(A) 250 (B) 450✓
(C) 360 (D) 480

17. A jar contains three parts of pure milk and one part of water. How much of the mixture must be drawn and water substituted, in order that the resulting mixture may be half milk and half water?
(A) ½ nd (B) $^{1}/_{5}$ th
(C) $^{1}/_{3}$ rd✓ (D) ¼ th

18. A plane travelling 600 miles per hour is 30 miles from Lahore Airport at 4:50 pm. At what time will it arrive at the airport?
(A) 5:01 pm✓ (B) 5:02 pm
(C) 5:00 pm (D) 5:03 pm

19. A bag of chicken feed will feed 18 chickens for 54 days. How many days will it feed 12 chickens?
(A) 70 (B) 53
(C) 81✓ (D) 72

20. The average age of a group of 16 persons is 28 years and 3 months. Two persons each 58 years old left the group. The average age of the remaining persons is:
(A) 42 (B) 40
(C) 26 (D) 24✓

21. What is the smallest number which when added to 135 makes it a perfect square?
(A) 9✓ (B) 5
(C) 6 (D) 7

22. If 9 men need 15 days to complete a task, how many days would it take to complete this task if 3 additional men were employed?
(A) 12 (B) 10
(C) 11 ¼✓ (D) 6

23. The average age of a class of 20 boys is 14.95 years. The average of the class is raised to 15 years by the coming of a new boy. How old is this boy?
(A) 14 years (B) 18 years
(C) 15 years (D) 16 years✓

24. The value of a fraction is $^{2}/_{5}$. If the numerator is decreased by 2 and the denominator increased by 1, the resulting fraction is equivalent to ¼. Find the numerator of the original fraction.
(A) 6✓ (B) 10
(C) 12 (D) 4

25. A motorist travelled 195 km in 3 hours. How far did he travel in 4 $^{1}/_{2}$ hours?
(A) 282 km (B) 292 ½ km✓
(C) 585 km (D) 480 km

TEST NO. 4

1. 25 men can reap a field in 20 days. When should 15 men leave the work, if the whole field is to be reaped in 37½ days after they leave the work?
(A) 5 days✓ (B) 10 days
(C) 7 days (D) 7½ days

2. When an electric iron is sold for Rs.76, the gain is 52 per cent. The gain, when it is sold for Rs.74, is..... per cent.
(A) 50 (B) 48✓
(C) 46 (D) 44

3. If each bag of tokens weighs 5¾ pounds, who many pounds do 3 bag weigh?
(A) 16 ½ (B) 15 ¾
(C) 7 ¼ (D) 17 ¼✓

4. A man invests Rs. 9,000 in

company paying 6% per annum, when a share of face value of Rs.100 is selling for Rs. 150. What is his annual income and what percentage does he gets on his money?
(A) 3% (B) 5%
(C) 4%✓ (D) 7%

5. Six men earn as much as 7 women as much as 3 boys, and 4 boys as much as 5 girls. If a girl earns eight annas a day, what does a man earn a day?
(A) Rs 3. 00 (B) Rs 1.78✓
(C) Rs 2. 00 (D) Rs 1. 50

6. The number of half pound packages of tea that can be weighed out of a box that holds 10 ½ lb. of tea is:
(A) 21✓ (B) 20 ½
(C) 11 (D) 20

7. Munir loses 1/3rd of his money in the first game, 3/5th of the remainder in the second and 4/7th of the rest in the third. Thus, he is left with.....th of his money.
(A) $^{14}/_{35}$ (B) $^{4}/_{15}$
(C) $^{4}/_{35}$✓ (D) $^{8}/_{15}$

8. Asghar spends equal amount in buying two types of oranges at the rate of 5 oranges for a rupee and 10 oranges for 3 rupees. The average cost of the oranges will be:
(A) 27 paisa (B) 25 paisa
(C) 26 paisa (D) 24 paisa✓

9. The volume of a cube is 64 cm^3. If 6 such cubes are piled one on top of the other, what will be their total height?
(A) 24 cm✓ (B) 128 cm
(C) 96 cm (D) 48 cm

10. A rectangular tank 25 cm by 20 cm contains 5 litres of water. What is the height of the water in the tank?
(A) 12 cm (B) 10 cm✓
(C) 8 cm (D) 15 cm

11. If x must be greater than 4, which of the following must have the least value?
(A) 4/x-1 (B) 4/x
(C) 4/x-1✓ (D) x/4

12. The average of two numbers is M, and one number is N. The other number is:
(A) M-N (B) 2M-N✓
(C) 2M (D) 2N

13. By giving a discount of 10 per cent on the marked price Rs. 1,100 of a sofa set, dealer gains 10 per cent. The cost price of the sofa set is:
(A) Rs. 1,000 (B) Rs. 981
(C) Rs. 891 (D) Rs. 900✓

14. Find the value of x if the average of 1.0,0.8,0.2 and x is exactly 0.6:
(A) 0.4✓ (B) 0.2
(C) 2.4 (D) 0.66

15. A man has R rupees and spends P paisa. How many rupees has he left?
(A) 100R-P (B) R-P
(C) 100 R-P/100✓ (D) R-P/100

16. How many days are there in w weeks and w days?
(A) 7 (B) 8w✓
(C) 7w (D) 14w

17. A man sold a pen for Rs.13.20 to make a profit of 10 per cent. In order to earn a profit of 15 per cent, he should have sold it for:
(A) Rs. 13.80✓ (B) Rs. 13. 86
(C) Rs. 13. 58 (D) Rs. 13. 78

18. The rent of a flat is Rs. 250 per month. The house tax is to be charged 10 per cent yearly, but 12 per cent of the rent is deducted for repairs and other expenses. The house tax is:
(A) Rs. 316 (B) Rs. 360
(C) Rs. 364 (D) Rs. 264✓

19. The average age of a class of 40

students is 12 years. If the teacher's age is also included, the average age increases by one year. The teacher's age is?

(A) 52 years (B) 53 years✓
(C) 51 years (D) 54 years

20. Flowers in a basket double themselves after every minute. In an hour, the basket is full. The basket would be half full after:

(A) 59 min✓ (B) 30 min
(C) 45 min (D) 58 min

21. A man spent $^{15}/_{16}$ of his entire fortune in buying a car for Rs.7,500. How much money did he possess?

(A) Rs. 6,000 (B) Rs. 8,000✓
(C) Rs. 8,500 (D) Rs. 9,000

22. A tank 30 cm by 20 cm by 10 cm is $^{1}/_{5}$ full of water. How much water is in the tank?

(A) 3000 cm^3 (B) 6000 cm^3
(C) 1200 cm^3✓ (D) 1000cm^3

23. During the first year, the population of a town increased by 4% and during the second year it diminished by 4%. If at the end of 2nd year, its population, was 2596, in the beginning it was:

(A) 2,550 (B) 2,600
(C) 2,400 (D) 2,500✓

24. A solution of 27 gallons of acid contains 9 gallons of pure acid. How much water, in gallons, should be added to produce a 25 per cent solution of this acid?

(A) 9✓ (B) 18
(C) 27 (D) 25

25. Aslam rides his bicycle at an average rate of m kilometres per minute. Faraz walks half the distance is 3 times the length of time. What is Faraz rate, in kilometres per minute?

(A) m/30 (B) M/40
(C) m/10 (D) M/6✓

TEST NO. 5

1. A fort is provisioned for 75 days. After 25 days, a reinforcement of 500 men arrives and the food then lasts only 40 days. How many men were there in the fort?

(A) 200✓ (B) 1,700
(C) 1,500 (D) 1,000

2. In what proportion must a grocer mix rice at Rs.1.2 per kg and Rs.1.44 per kg so as to make a mixture worth Rs.1.26 per kg?

(A) 4:3 (B) 2:5
(C) 3:4✓ (D) 4:2

3. Rahim can do a work in 80 hours. If he and his son work together, the time taken is 20 hours. The son working in the same capacity as when he was working with his father, can finish the work in?

(A) 20 hours (B) 25 hours
(C) 50 hours (D) 60 hours✓

4. At an election where there are two candidates only, the candidate who gets 62% of the votes is elected by a majority of 154 votes, the total number of votes is:

(A) 500 (B) 600✓
(C) 1,000 (D) 700

5. Two trains of length 65 and 55 m are travelling in the same direction at 20 and 47 km/h resp. The faster train will pass the other completely in:

(A) 20 sec (B) 27 sec
(C) 16 sec✓ (D) 14 sec

6. A sum of money becomes double on simple interest in 20 years. It will quadruple at the same rate in:

(A) 40 years (B) 80 years
(C) 50 years (D) 60 years✓

7. At the rate of 2 for 5 paisa, how many envelopes can be purchased for 65 paisas?

(A) 32 (B) 26✓

(C) 34 (D) 30

8. Six consecutive integers are given. The sum of the first three is 27. What is the sum of the last 3?
(A) 30 (B) 32
(C) 33 (D) 36✓

9. 8 years from now Babar will be twice the age he was 6 years ago. What is his present age?
(A) 20✓ (B) 12
(C) 26 (D) 4

10. A man insures 80% of his property and pays a 2½% premium amounting to Rs.348. What is the total value of his property?
(A) Rs. 19,000 (B) Rs. 18,400
(C) Rs. 17,400✓ (D) Rs. 18,000

11. A piece of food weighing 10 ounces is found to have a weight of 8 ounces after drying. The moisture content was:
(A) 25% (B) 20%✓
(C) 40% (D) 15%

12. If Nasir must have a mark of 80% to pass a test of 35 items, the number of items he may miss and still pass the test is?
(A) 7✓ (B) 8
(C) 12 (D) 26

13. How many miles does a car travel if it averages at the rate of 35 miles per hour for 3 hours and 24 minutes?
(A) 109 (B) 110
(C) 112 (D) 119✓

14. If the price of sugar be raised by 20% the percentage of consumption that a housewife has to decrease in order not to increase her expenditure is:
(A) $16\frac{2}{3}\%$✓ (B) 20%
(C) 26% (D) 35%

15. The population of a town increases by 5% annually and its present population is 9,261. The population three years ago was:
(A) 9,000 (B) 8,000✓
(C) 9,800 (D) 8,900

16. In what proportion must a man mix milk at Rs.11 a litre with milk at Rs. 6 a litre, so that the mixture may be worth Rs. 8 a litre?
(A) 3:2 (B) 5:4
(C) 2:3✓ (D) 4:5

17. If 1,200 men in a fort have provisions for 28 days. After 4 days, 300 men leave the fort. How long will food last now?
(A) 30 days (B) 32 days✓
(C) 34 days (D) 42 days

18. What is the area in square inches, of a square if its diagonal is 6 inches?
(A) 9 (B) 12
(C) 15 (D) 18✓

19. Saghir left his home at 8.00 am and travelled at the average rate of 40 miles per hour until 11.30 am. What distance, in miles did he cover during the period?
(A) 140✓ (B) 120
(C) 100 (D) 80

20. If 'a' apples cost 'd' dollars, how many apples can be bought for 'x' dollars?
(A) dx (B) ax/d✓
(C) a/d (D) ad/x

21. In an election, where there are only 2 candidates one who gets 43% of the votes is rejected by a majority of 420 votes. The total number of votes polled is:
(A) 1,920 (B) 1,720
(C) 2,100 (D) 3,000✓

22. The percentage of water in 20 litres of adulterated milk is 10. The quantity of water to be added to it, to increase the percentage of water to 25% is:

(A) 4 litres✓ (B) 6 litres
(C) 7 litres (D) 8 litres

23. The perimeter of a square is 8 cm. What is its area?
(A) 2 cm^2 (B) 4cm^2
(C) 16 cm^2 (D) 32 cm^2

24. If $^{?}/_{28} = {}^{63}/_{7}$, then which of the following numbers replaces the question mark?
(A) 14 (B) 28
(C) 42✓ (D) 21

25. Which of the following numbers is not a square of any natural number?
(A) 1,025✓ (B) 961
(C) 1,296 (D) 676

TEST NO. 6

1. Simple interest on Rs.400/- in 3 years at a rate of 5% p.a. is:
(A) Rs. 70 (B) Rs. 80
(C) Rs. 60✓ (D) Rs. 30

2. At p paisa per orange, what is the price, in rupees, for 1 dozen oranges?
(A) $^{p}/_{12}$ (B) $^{p}/_{100}$
(C) $^{12}/_{100p}$ (D) $^{12p}/_{100}$✓

3. Asif and Zahid enter into a partnership. Asif contributes Rs.4,000 for 8 months and Zahid Rs.6,000 for four months. Asif's share in a total profit of Rs. 3500 is:
(A) Rs. 1,500 (B) Rs 2,000✓
(C) Rs. 2,500 (D) Rs. 2,400

4. In a camp, there is provision for 1,600 participants for 60 days. Actually 1,200 participated, now the provision will last for:
(A) 96 days✓ (B) 80 days
(C) 75 days (D) 100 days

5. One pendulum ticks 57 times in 58 seconds and another 608 times in 608 seconds. If they start together, the number of times they will tick together in first hour is:
(A) 56 times (B) 57 times✓
(C) 60 times (D) 58 times

6. In exam, 40% students fail in Maths, 30% in English and 10% in both. Find the pass percentage.
(A) 50% (B) 70%
(C) 40%✓ (D) 60%

7. Nasim invests a sum of money for 5 years at 4% simple interest. He gets Rs.3,600 after 5 years on withdrawing the money. So the money invested is:
(A) 3,000✓ (B) 2,800
(C) 2,700 (D) 3,200

8. What is the average of 0.6, 6.6, 0.4, 2.4?
(A) 2 (B) 10
(C) 1 (D) 2 ½✓

9. A chemist has 80 pints of a 2% salt solution. How many pints of pure salt must be added to produce a solution of 30% pure salt?
(A) 8 (B) 16
(C) 11.4✓ (D) 4.6

10. The regular price of a TV set that sold for Rs. 118.80 at a 20% reduction sale is:
(A) Rs. 158.40 (B) Rs. 148.50✓
(C) Rs. 138.84 (D) Rs. 98.40

11. If a man walks w miles in 4 hours, and then rides r miles in the same length of time, what is his average rate, in miles per hours, for the entire trip?
(A) $^{R+W}/_{24}$✓ (B) $^{2(R+W)}/_{4}$
(C) $^{R+W}/_{4}$ (D) $^{4}/_{R-W}$

12. Sabir bought his home for Rs. 30,000 and sold it for Rs. 60,000. What was the per cent of increase?
(A) 50 (B) 200
(C) 100✓ (D) 150

13. How long would a car travelling at 30 miles per hour take to cover a

distance of 44 feet?
(A) 1 min (B) 1 sec✓
(C) 1.64 sec (D) 2.64 sec

14. Which of the following numbers belongs to the series given below: 7, 18, 29, 40.....
(A) 2,095 (B) 2,007
(C) 2,094 (D) 2,097✓

15. In a camp, there is provision for 1,600 participants to last 60 days. If the present strength of the camp is 1,200, the provision will last for _____ days.
(A) 96 (B) 86
(C) 80✓ (D) 72

16. The money to be invested in 4% stock at Rs. 90 to provide an annual income of Rs. 100 is:
(A) Rs. 2,500 (B) Rs. 1,800
(C) Rs. 2,000 (D) Rs. 2,250✓

17. 15 men can do a piece of work in 20 days, in how many days can 25 men finish the same work?
(A) 12✓ (B) 15
(C) 18 (D) 20

18. In a school in which 40% of the enrolled students are boys, 80% of the boys are present on a certain day. If 1,152 boys are present, the total school enrollment is:
(A) 1,420 (B) 3,600✓
(C) 2,880 (D) 4,600

19. In the following questions, one number is wrong in the series. Find out the wrong number.
(A) 17✓ (B) 7
(C) 31 (D) 63

20. The population of a town has increased from 80,000 to 1,00,000 in the last 20 years. Find out the percentage of increase.
(A) 10 (B) 20
(C) 25✓ (D) 30

21. 10 minutes after a plane leaves the airport, it is reported that the plane is 40 miles away. What is the average speed of the plane, in miles per hour?
(A) 420 (B) 240✓
(C) 400 (D) 600

22. If 3 men or 6 boys can do a piece of work in 20 days, how many days will 6 men and 8 boys take to do the same work?
(A) 6✓ (B) 8
(C) 10 (D) 16

23. The value of super company stock dropped from Rs. 25 a share to Rs. 21 a share. Find the percentage of decrease.
(A) 8 (B) 4
(C) 12 (D) 16✓

24. If 4 men or 7 boys can do a work in 29 days, then 12 men and 8 boys will do the same work in:
(A) 9 days (B) 8 days✓
(C) 7 days (D) 10 days

25. By selling oranges at 329 rupees, a man loses 40%. How much a rupee must he sell to gain 20%?
(A) Re. $^1/_{16}$✓ (B) Re. $^1/_{14}$
(C) Re. $^1/_{10}$ (D) Re. $^1/_{12}$

TEST NO. 7

1. Find a number which, after being multiplied by 5 will exceed 60 as much as it is now short of 60:
(A) 15 (B) 10
(C) 25 (D) 20✓

2. Oranges are bought at 9 for a rupee and an equal number at 7 for a rupee. What is the gain or loss percentage if they are sold at 8 for a rupee?
(A) $^{15}/_{16\%}$ (B) $^{19}/_{16\%}$✓
(C) $^{23}/_{16\%}$ (D) $^{14}/_{16\%}$

3. Which of the following numbers

belong to the series: 18, 25, 32, 39.....
(A) 2,097✓ (B) 2,096
(C) 2,099 (D) 2,098

4. Akbar receives a salary raise from Rs. 25,000 to Rs. 27,500. Find the percentage of increase.
(A) 15 (B) 12 ½
(C) 10✓ (D) 9

5. A census shows that on a certain block, the number of children in each family is 3, 4, 4, 0, 1, 2, 0 & 2, respectively. Find the average number of children per family.
(A) 4 (B) 2✓
(C) 3 (D) 1 ½

6. A motorist travels for 3 hours at 40 miles per hour and then covers a distance of 80 miles in 2 hours and 40 minutes. His average rate for the entire trip was:
(A) 35.3 m.p.h. ✓ (B) 36 m.p.h.
(C) 37 m.p.h. (D) 35.5 m.p.h.

7. A garrison of 1,500 men has provisions for 6 weeks. At the end of the first two weeks, 450 men desert. How long after this will the food last?
(A) 20 days (B) 30 days
(C) 10 days (D) 40 days✓

8. The present worth of Rs. 1,716 due after 8 months at the rate of 6% p.a. is:
(A) Rs. 1,664 (B) Rs. 1,650✓
(C) Rs. 1,600 (D) Rs. 1,640

9. Tanvir, Shabbir and Saghir can do a piece of work respectively in 15 days, 6 days and 10 days. All the three together will finish three times that work in:
(A) 10 days (B) 8 days
(C) 9 days✓ (D) 6 days

10. A. boy buys an article at 75% of its value and sells it for 20% more than its value, his percentage profit based on cost will be:
(A) 70% (B) 60%✓
(C) 50% (D) 75%

11. Two tablespoons =1 ounce liquid, 4 tablespoons =¼ cup. How many ounces are there in 1 cup?
(A) 8✓ (B) 12
(C) 24 (D) 32

12. Basit leaves by automobile at 9.00 a.m. and stops for repairs at 9:20 a.m. If the distance covered was 18 miles, what was the average velocity, in miles per hour for this part of the trip?
(A) 60 (B) 36
(C) 63 (D) 54✓

13. A clerk filled 73 forms on Monday, 85 forms on Tuesday, 54 on Wednesday, 92 on Thursday and 66 on Friday. What was the average number of forms filled per day?
(A) 74✓ (B) 72
(C) 60 (D) 62

14. Which of the following fraction is the largest?
(A) $^{10}/_{11}$ (B) $^{13}/_{14}$
(C) $^{14}/_{15}$✓ (D) $^{12}/_{13}$

15. Aslam, Ashraf and Akram are employed to do a work for Rs. 529. Aslam and Ashraf together are supposed to do $^{19}/_{23}$ of the work. So Akram should be paid:
(A) Rs. 96 (B) Rs. 92✓
(C) Rs. 80 (D) Rs. 69

16. If 20 men can do a piece of work in 8 days, how many men will finish it in 10 days?
(A) 16✓ (B) 4
(C) 8 (D) 12

17. The perimeter of a rectangle is 24 cm. Find its breadth if its length is 8 cm.
(A) 16 cm (B) 6 cm

(C) 8 cm (D) 4 cm✓

18. Javed is now x-10 years old. How old will he be 10 years from now?
(A) x-20 (B) x+10
(C) X✓ (D) x+20

19. An automobile travels at the ratio of 55 miles per hours. How many minutes will it take to travel $^{2}/_{3}$ of a mile at this ratio?
(A) 0.72✓ (B) 2.2
(C) 0.2 (D) 1.2

20. Working 8 hours a day, a work is done in 5 days. For how many hours a day the work is done, if it is finished in 4 day?
(A) 8 hrs (B) 10 hrs✓
(C) 12 hrs (D) 16 hrs

21. The mode of the numbers 16, 15, 17, 12, 15, 15, 18, 19 and 18 is:
(A) 16 (B) 18
(C) 15✓ (D) 19

22. The average of two numbers is a. If the larger number is 1, what is the smaller?
(A) 1–2a (B) 1–a
(C) a–1 (D) 2a–1✓

23. The distance between two cities is 1,800 miles. How many gallons of gasoline will a motorist use with an automobile that uses (on the average) 1 gallon of gasoline for each 12 miles?
(A) 160 (B) 150✓
(C) 200 (D) 180

24. A certain variety of tea worth Rs. 30.20 per kg is mixed with a lower quality of tea priced at Rs. 20.50 per kg so that the mixture is worth Rs. 25.40 per kg. The ratio of the two varieties of tea is:
(A) 49:48✓ (B) 49:24
(C) 49:6 (D) 49:18

25. If 3 men or 6 boys can do a work in 20 days. Then 6 men and 8 boys shall take:
(A) 8 days (B) 10 days
(C) 20 days (D) 6 days✓

TEST NO. 8

1. By selling a watch for Rs. 50, a man lost 10%. In order to gain 26%, he must sell it for:
(A) Rs. 65 (B) Rs. 70✓
(C) Rs. 80 (D) Rs. 75

2. In a business, Zahid contributes Rs. 15,000 and Shahid Rs 9,000 Shahid gets 10% of the profit as his management charges and the rest of it is shared by them in proportion to their investments. If the total profit is Rs. 4,000, the share of Zahid is:
(A) Rs. 1,500 (B) Rs. 2,200
(C) Rs. 2,000 (D) Rs 2,500✓

3. Khalid loses 1/3rd of his money in the first game, 3/5th of the remainder in the second and 4/7th of the rest in the third. Thus, he is left with..... th of his money.
(A) $^{4}/_{35}$✓ (B) $^{24}/_{35}$
(C) $^{14}/_{35}$ (D) $^{9}/_{15}$

4. A man walked into the woods at the rate of 4 miles per hour and returned over the same road at the rate of 3 miles per hour. If he completed the entire trip in 3½ hours, how far in miles into the woods did he walk?
(A) 4 (B) 5
(C) 6✓ (D) 7

5. There are 3 to 4 tablespoons of bread flour in 1 ounce. What is the maximum number of tablespoons of bread flour in 12 ounces?
(A) 48✓ (B) 42
(C) 32 (D) 36

6. 20 men can do a job in 7 days, 40 men can do double the job in?
(A) 14 days (B) 9 days

(C) 7 days✓ (D) 3½ days

7. In what time will Rs. 4,000 at 3% per annum produce the same interest as Rs. 5,000 in 5 years at 4% per annum simple interest.
(A) 9% (B) $8^1/_{3\%}$✓
(C) 7% (D) 15%

8. By walking 3/5 of the usual speed, a man reaches office 20 minutes late. What is usual time?
(A) 45 min (B) 40 min
(C) 1 hr (D) 50 min✓

9. A man invests Rs. 9,000 in a company paying 6% per annum, when a share of face value of Rs. 100 is selling for Rs. 150. What is his annual income and what percentage does he get on his money?
(A) 5% (B) 6%
(C) 4%✓ (D) 3%

10. If income tax be reduced from 3 1/2% to 3 1/3%, the difference it makes to a man whose annual income is Rs. 2,800 is:
(A) Rs. 5 (B) Rs. $4\,^2/_3$✓
(C) Rs. 4.25 (D) Rs.4.50

11. The perimeter of a rectangle is 24 cm. Find its breadth if its length is 8 cm.
(A) 4 cm✓ (B) 12 cm
(C) 16 cm (D) 10 cm

12. A tank measuring 6 cm by 5 ½ cm by 3.4 cm is half-filled with wather. Find the volume of water in the tank.
(A) 18.7 cm^3 (B) 14.5 cm^3
(C) 20.4 cm^3✓ (D) 56.1 cm^3

13. A class of students obtained an average of 45 marks, on rechecking it was found that marks had been entered wrongly in two cases. After correction, these marks were increased by 24 and 36. The corrected average marks per student are:
(A) 47✓ (B) 56
(C) 65 (D) 75

14. A man spends Rs. 230. 50 on an average during the first eight months. During the next 4 months, he spends Rs. 180.00 on average. He took a loan of Rs. 164.00 during the years. Find his monthly income on average of the year.
(A) 400 (B) 250
(C) 180 (D) 200✓

15. A man spends 12 1/2% of his money and after spending 75% of the remainder, he had Rs. 175 left. The money he had at first was:
(A) Rs. 1,200 (B) 1,000
(C) Rs. 800✓ (D) 700

16. A milk-seller purchases milk at the rate of 24 p. per litre and adds one-fourth of water to it. Find what profit percentage does he make by selling the mixture at 30 p. per litre.
(A) 56% (B) 54 ½✓
(C) 56 ½ % (D) 58%

17. Supposing that telegraph poles on a rail road are 50 metres apart. How many will be passed by a train in 2 hours if the speed of the train is 40 km/hour?
(A) 800 (B) 1,200
(C) 1,400 (D) 1,600✓

18. A can copy 75 pages in 25 hours. A and B together can copy 135 pages in 27 hours. In what time can B copy 42 pages?
(A) 19 hrs (B) 21 hrs✓
(C) 17 hrs (D) 27 hrs

19. 3 cubes of a metal, whose edges are 3 cm, 4 cm and 5 cm, respectively, are melted into a single cube. The edge of the new cube is:
(A) 6 cm✓ (B) 12 cm
(C) 4 cm (D) 8 cm

20. The perimeter of a square is 8 cm what is its area?
(A) 2 cm^2 (B) 4 cm^2✓

(C) 16 cm^2 (D) 32 cm^2

21. What is the average of a student who received 90 in English, 84 in Algebra, 75 in French and 76 in Music, if the subjects have the following weights: English 4, Algebra 3, French 3, and Music 1?
(A) 82 (B) 81
(C) 80 (D) 83✓

22. A man runs 7 yards in m minutes. What is his rate in yards, per hours?
(A) $^{60m}/_{y}$ (B) $^{m}/_{60y}$
(C) $^{60y}/_{m}$✓ (D) $^{}/_{60my}$

23. How many different three-digit numbers can be formed by 0.3 and 5 if none of them is repeated in number?
(A) 4✓ (B) 3
(C) 5 (D) 2

24. If a man were to sell his horse for Rs. 720, he would lose 25%. What must he sell it for to gain 25%?
(A) Rs. 1,000 (B) 1,250
(C) Rs. 1,200✓ (D) 1,300

TEST NO. 9

1. Zahid sells a watch to Abrar at a gain of 10% and Abrar sells it to Suhail at a gain of 5%. If Suhail has to pay Rs. 442 for it, the cost price of the watch for Zahid is:
(A) Rs. 500 (B) Rs. 400✓
(C) Rs. 600 (D) Rs. 300

2. The first, second and third class fares between two stations were 10:8:3 and the number of first, second and third class passengers between the two stations in the year was Rs. 8050. How much was realized by the sale of second class tickets?
(A) 2,800 (B) 3,600
(C) 3,200✓ (D) 3,000

3. In an examination 52% of the candidates failed in English, 42% failed in Mathematics, 17% failed in both. Find the percentage of those who passed in both the subjects.
(A) 20%✓ (B) 30%
(C) 25% (D) 23%

4. If 1,200 men in a fort have provisions for 28 days. After 4 days, 300 men leave the fort. How long will food last now?
(A) 28 (B) 30
(C) 20 (D) 32✓

5. A train travels a distance of 40 km per hour on an average with stoppages and without stoppages its speed is 50 km per hour. How much time on an average per hour it stops?
(A) 15 min (B) 25 min
(C) 12 min✓ (D) 20 min

6. A medical student has to secure 40% marks to pass. He gets 40 and fails by 40 marks. Find the max. marks.
(A) 200✓ (B) 150
(C) 225 (D) 175

7. A car passes city x at 9:55 a.m. and city y at 10:15 a.m., city x is 30 miles from city y. What is the average rate of car, in miles per hour?
(A) 60 (B) 90✓
(C) 120 (D) 100

8. The grades received on a test by 20 students were 100, 55, 75, 80, 65, 65, 85, 90, 80, 45, 40, 50, 85, 85, 85, 80, 80, 70, 65 and 60. The average of these grades is:
(A) 72✓ (B) 75
(C) 80 (D) 70

9. A man sells a horse for Rs. 800 and loses something. If he had sold it for Rs. 980, his gain would have been double the former loss. Find cost price.
(A) Rs. 1,000 (B) Rs. 750

(C) Rs. 800 (D) Rs. 860✓

10. A sum of money put out at compound interest amounts in 2 years to Rs. 672 and in 3 years to Rs. 714. Find the rate of interest.
(A) 6 % (B) 5 ¼ %
(C) 6 ¼ %✓ (D) 5%

11. In the exam, 45% students failed and 550 students were successful. The total number of students who appeared in the exam was:
(A) 1,000✓ (B) 900
(C) 1,500 (D) 800

12. Abid can do a work in 30 hours. If he and his son work together, the time taken is 20 hours. The son working in the same capacity as when he was working with his father, can finish the work in:
(A) 50 hours (B) 25 hours✓
(C) 40 hours (D) 60 hours

13. A student loses a mark for every wrong answer and scores 2 marks for every correct answer. If he answers all the 60 questions in an exam and secures 39 marks, how many of them were correct?
(A) 27✓ (B) 29
(C) 31 (D) 33

14. The distance between 3 cities is 1,800 miles. How many hours would it take a train with an average speed of 60 miles per hour to make the trip?
(A) 40 (B) 35
(C) 48 (D) 30✓

15. What is the average of 1/2., 5/6, 3/4, 4/12?
(A) $^{7}/_{8}$ (B) 2 ½
(C) $^{5}/_{8}$✓ (D) $^{2}/_{5}$

16. A rectangle has an area of 84 cm^3. If its breadth is 7 cm, find its length:
(A) 21 (B) 20
(C) 91 (D) 12✓

17. A dealer marks his goods 20% above his cost price. If he gives a discount of 10% on his marked price, the profit he earns on his goods:
(A) 7 (B) 8✓
(C) 10 (D) 12

18. A pharmacist wants to convert 100 ounces of a 3% tincture of iodine to a 2% tincture of iodine. How many ounces of alcohol she adds to her original solution?
(A) 50✓ (B) 65
(C) 100 (D) 150

19. Rashid purchased a plot for Rs. 8,000. He sells the plot to Shahid at a profit of 20%. Shahid in turn sells that plot to Javed at a loss of 20%/ The plot costs Javed:
(A) Rs. 12,000 (B) Rs. 10,000
(C) Rs. 8,670 (D) Rs. 7,680✓

20. Six women or nine girls do a piece of work in 10 days. Eight women and three girls will do the same work in:
(A) 9 days (B) 6 days✓
(C) 4 days (D) 2 days

21. The mode of numbers 16, 15, 17, 12, 15, 15, 18, 19 and 18 is:
(A) 15✓ (B) 18
(C) 16 (D) 21

22. At what time will a train travelling at 50 miles per hour arrived at the station, if it is 5 miles from the station at 5.00 pm?
(A) 5:10 (B) 5:05
(C) 5:06✓ (D) 5:08

23. The banker's discount on Rs. 600 for a certain time at a certain rate is Rs. 120. The banker's gain then is:
(A) Rs. 15 (B) Rs. 20✓
(C) Rs. 10 (D) Rs. 5

24. A man buys a scooter for Rs. 7,000 and sells it for Rs. 11, 500. The percentage of profit is nearly ..... percent.

(A) 70.5 (B) 58
(C) 68 (D) 64.3✓

25. The volume of a cuboid with a base area of 96 cm^2 and height of 4 cm is:
(A) 412 cm^3 (B) 384 cm^3✓
(C) 48 cm^3 (D) 96 cm^3

TEST NO. 11

1. By selling goods for Rs. 186, a merchant loses 7% on his outlay. Find the percentage profit on his outlay when he sells the same goods for Rs. 210.
(A) 5%✓ (B) 10%
(C) 12% (D) 8%

2. A rectangular tank measures 33 cm by 15 cm by 12 cm. How many litres of water is left when $^1/_3$ of it is poured out?
(A) 4.96 L (B) 5.94 L
(C) 3.96 L✓ (D) 1.97 L

3. Six men earn as much as 7 women, 2 women as much as 3 boys and 4 boys as much as 5 girls. If a girl earns Rs. 4 a week, what does a man earn in a day?
(A) Rs. 1.50 (B) Rs. 1.25✓
(C) Rs. 2.00 (D) Rs. 1.75

4. A person can row 7 ½ km an hour in still water and he finds that it takes him twice as long to row up as to row down the river. Find the rate of the stream.
(A) 3 km p/h (B) 2 km p/h
(C) 4 km p/h (D) 2 ½ km p/h✓

5. The true discount on Rs. 880 at 5 per cent per annum is Rs. 80. The sum is due after:
(A) 1 year (B) 3 years
(C) 2 years✓ (D) 4 years

6. A's mother is twice as old as A's brother. A is 6 years younger than his brother but 4 years older than his sister. If A's sister is 15, his mother's age is:
(A) 40 (B) 45
(C) 42 (D) 50✓

7. If 1,200 men in a fort have provisions for 28 days. After 4 days, 300 men leave the fort. How long will food last now?
(A) 32✓ (B) 28
(C) 30 (D) 34

8. Raja bought a T.V. priced at Rs. 2,800. He was given 2 successive discounts of 10 and 5 per cent. If he had to pay 10 per cent salary tax, the net amount he paid was:
(A) Rs. 2,600 (B) Rs. 2,633.40✓
(C) Rs. 2,592 (D) Rs 2,660

9. A train travelling 100 miles at m miles per hour arrived at its destination 1 hour late. How many miles can an hour should it have travelled to arrive on time?
(A) $^{100-m}/_m$ (B) $^{100m}/_{100+m}$
(C) $^{100}/_m$ (D) $^{100m}/_{100-m}$✓

10. What profit per cent is made by selling an article at a certain price if by selling at two-third of that price there would be a loss of 20%?
(A) 25% (B) 30%
(C) 20%✓ (D) 15%

11. One cup of condensed, sweetened milk weighs 11 ounces. How many ounces of milk will remain unused for a recipe requiring 2 cups of milk when a housewife opens four 6-ounce cans of condensed milk?
(A) 10 (B) 2✓
(C) 20 (D) 22

12. A dealer sold a shirt at a profit of 15%. Had he sold it for Rs. 4 more, his profit would have increased by 5%. The cost price of the shirt was:

(A) Rs. 75✓ (B) Rs. 60
(C) Rs. 125 (D) Rs. 80

13. A snapshot measures 2½ inches by $1\frac{7}{8}$ inches. It is to be enlarged so that the longer dimension will be 4 inches. The length of the enlarged shorter dimension will be:
(A) 4 in (B) 3 in✓
(C) 2 ½ in (D) 5 in

14. The arithmetic mean of 73.8, 92.2, 64.7, 43.8, 56.5 and 46.4 is:
(A) 64.9 (B) 72.4
(C) 60.6 (D) 62.9✓

15. A man driving a distance of 90 miles averages 30 miles per hour. On the return trip, he averages 45 miles per hour. His average speed for the round trip, in miles per hours, is:
(A) 38 (B) 34
(C) 36✓ (D) 40

16. Rs. 2,500 invested at 4% per annum simple interest will amount to Rs. 3,000 in:
(A) 3 years (B) 2.5. years
(C) 4 years (D) 5 years✓

17. The volume of a cuboid is 396 cm^3. The length of the cuboid is twice its breadth. If its breadth is 6 cm, what is its height?
(A) 5.5 cm✓ (B) 10.5 cm
(C) 22 cm (D) 10 cm

18. Asif and Zahid enter into a partnership. Asif contributes Rs. 4,000 for 8 months and Zahid Rs. 6,000 for 4 months. Asif's share in a total profit of Rs. 3500 is:
(A) Rs. 2,500 (B) 1,500
(C) Rs. 2,000✓ (D) 1,750

19. A general wishing to draw up his 7,250 men in the form of a solid square found that he had 95 men over. What is the number of men in the front?
(A) 85✓ (B) 100
(C) 150 (D) 80

20. The median of the numbers 8, 5, 7, 5, 9, 9, 9, 1, 8, 10, 5 and 10 is:
(A) 6 (B) 10
(C) 8✓ (D) 5

21. What is the length of the bridge which a man riding 15 km an hour can cross in 5 minutes?
(A) ½ km (B) 1 ¼ km✓
(C) 2 km (D) 4 km

22. By selling 4 dozen mangoes for 13 rupees, it was found that 3/10 of the outlay was gained. What ought the retail price per mango have been in order to have gained 60 per cent?
(A) Re. $\frac{1}{3}$ (B) Re ½
(C) Re. $\frac{2}{3}$ (D) Re ¾

23. A can do a piece of work in 12 days. Along with B, he can do the work in 8 days, B alone can finish the work in .....days.
(A) 20 (B) 10
(C) 18 (D) 24✓

24. A sum of Rs 1,500 was lent partly at 6% and partly at 5%. The annual interest from the investment is Rs. 85. The ratio of money lent at 6% to that lent at 5% is:
(A) 2:1✓ (B) 3:2
(C) 5:6 (D) 1:2

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C Physics

Physical Quantities and Units

Q.1 Which one is the highest power multiple?
A) Giga
B) Mega
C) Tera✓
D) Deca

Q.2 SI unit of charge is _____.
A) Ampere✓
B) Coulomb
C) Volt
D) Calorie

Q.3 The electrical analog of mass is electricity is _____.
A) Capacitance
B) Charge✓
C) Inductance
D) Resistance

Q.4 Which one of the following relations is correct?
A) 1 wb $m^{-2} = N\ m^{-1}\ A^{-1}$
B) 1 wb $m^{-2} = 1$ Tesla
C) 1 Tesla $= 10^4$ Gausses
D) All of these✓

Q.5 Which one of the following relations is correct?
A) 1 wb $m^{-2} = N\ m^{-1}\ A^{-1}$
C) 1 Tesla $= 10^4$ Gausses
B) 1 wb m-2 = 1 Tesla
D) All of these✓

Q.6 The principle of homogeneity of dimensions determines
A) Only variable in the equation
C) Only constant in the equation
B) Correctness of an equation✓
D) Constant and variable in the equation

Q.7 The dimensions of gravitational constant "G" are:
A) $[ML^{-2}T^{-1}]$
B) $[ML^{-2}T^{-2}]$
C) $[M^2L^{-2}T^{-1}]$
D) $[M^{-1}L^3T^{-1}]$ ✓

Q.8 Ultraviolent radiations cause:
A) Severe Crop Damage
B) Decay of Microorganisms
C) Sunburn, blindness, skin cancer
D) All of the above✓

Q.9 Unit vector in the direction of vector $2\hat{i} - 4\hat{j}$ will be:

A) $\frac{2\hat{i} - 4\hat{j}}{\sqrt{6}}$

B) $\frac{\hat{i} - 2\hat{j}}{\sqrt{5}}$ ✓

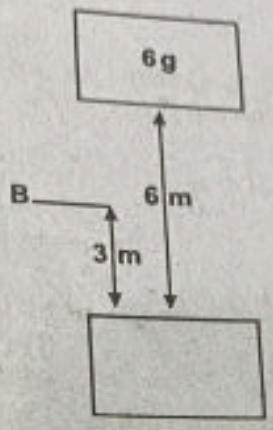
C) $\frac{4\hat{i} - 2\hat{j}}{\sqrt{10}}$

D) $\frac{\hat{i} - 2\hat{j}}{\sqrt{7}}$

Q.10 If the force of magnitude 8 N acts on a body in direction making an angle 30, and Y components will be:
A) $F_x = 3\ \sqrt{3}\ F_y = 4$
B) $F_x = 4\ 3\ F_y = 8$
C) $F_x = 4\ \sqrt{3}\ F_y = 4$✓
D) $F_x = 8$ ✓ $F_y = 4\ \sqrt{3}$

Q.11 The scalar product of i and k is:
A) Zero✓
B) 1
C) 90°
D) –1

Q.12 A body of mass 6 g falls under action of gravity. At initial position 'A' its P.E. is 480 J and K.E. is 0 J. During its downward journey at point 'B' its energies will be ($g = 10$ ms^{-2}):



A) P.E. = 300 J and K.E. = 180 J✓
B) P.E. = 230 J and K.E. = 250 J
C) P.E. = 180 J and K.E. = 300 J
D) P.E. = 250 J and K.E. = 230 J

Q.13 **If the mass of the bob of a pendulum is doubled its time period is:**
A) Halved.
B) Unchanged.✓
C) Doubled.
D) Increases four times.

Q.14 **Force in terms of base units is expressed as**
A) kg ms^{-2}.✓
B) kg m^2s^{-3}.
C) kg m^2s^{-2}.
D) None of these.

Q.15 **The units of E in $E=mc^2$ are**
A) kg m s^{-2}.
B) kg m^2 s^{-2}.✓
C) N m s^{-2}.
D) Both B and C.

Q.16 **Light year is a measure of**
A) Distance.✓
B) Intensity of light.
C) Time.
D) Velocity.

Q.17 **When the dimensions of both sides of an equation are equal, then the equation is said to be**
A) Simultaneous
B) Instantaneous
C) Homologous✓
D) Quadratic

Q.18 **Radian is a unit of angular displacement which can also be measured in degrees. How many radians are equal to one degree?**

A) $\frac{180}{\pi}$
B) $\frac{2\pi}{180}$
C) $\frac{\pi}{180}$✓
D) $\frac{\pi}{57.3}$

Q.19 **An electric charge in uniform motion produces:**
A) An electric field.
B) Both magnetic and electric fields.✓
C) A magnetic field.
D) Neither magnetic nor electric fields.

Q.20 If 'm' is the mass, 'c' is the velocity of light and $x = mc^2$, then dimensions of 'x' will be:
A) $[LT^{-1}]$ B) $[MLT^{-1}]$
C) $[ML^2T^{-2}]$✓ D) $[MLT^{-2}]$

Q.21 The wavelength 'λ' of a wave depends on the speed 'v' of the wave and its frequency 'f'. Decide which of the following is correct?
A) $f = v\lambda$ B) $f = \frac{v}{\lambda}$✓
C) $f = \frac{\lambda}{v}$ D) $f = v\lambda^{-2}$

Q.22 Name the quantity which can be measured by using base unit 'kgm^2s^{-3}'
A) Weight B) Power
C) Pressure **D) Work**✓

Q.23 The formula for electric field strength is '$E = F/Q$', where E is electric field strength and F is force and Q is charge. Which one of the following options gives the correct base units for electric field strength?
A) $kgms^{-3}A^{-1}$✓ B) $kg^2m^{-2}s^{-3}A$
C) $kgs^{-2}A^{-3}$ D) $ms^{-1}A^{-3}$

Q.24 Which set of the prefixes gives values in increasing order?
A) Pico, Mega, Kilo, Tera B) Tera, Pico, Micro, Kilo
C) Pico, Micro, Mega, Giga✓ D) Giga, Kilo, Milli, Nano

Q.25 The unit of temperature in base unit is:
A) Celsius **B) Kelvin**✓
C) Degree D) Fahrenheit

Forces

Q.1 The horizontal range of a projectile, at a certain place, is completely determined by
A) The angle of projection✓ B) The mass of the projectile
C) The initial velocity of projection D) Speed and mass of the projectile

Q.2 If velocity is double, then.
A) Momentum increase 4 times and K.E increases 2 times
C) Momentum and K.E remain same
B) Momentum increases 2 times and K.E increase constant
D) Momentum increases 2 times and K.E increases 4 times✓

Q.3 For a body to be in complete equilibrium
A) Linear acceleration is zero
C) Angular acceleration is zero
B) Linear acceleration is zero but angular acceleration is not zero
D) Linear acceleration and angular acceleration both should be zero✓

Q.4 If a force of magnitude 8 N acts on a body in direction making an angle 30, its x and
A) $F_X = 4\sqrt{3}$ and $F_y = 8$ B) $F_X\ 4\sqrt{3}$ and $F_y = 4$✓

C) $F_x = 8$ and $F_y\ 4\sqrt{3}$ D) $F_x = 8\sqrt{3}$ and $F_y = 4$

Q.5 The difference of a vector $\vec{B}$ and its negative vector $-\vec{B}$ is
A) A null vector
C) Equal to magnitude of vector $\vec{B}$
B) Twice the magnitude of vector $\vec{B}$ ✓
D) Smaller than magnitude of vector $\vec{B}$

Q.6 **Time of projectile's flight is**
A) $\frac{v_i^2 \sin^2\theta}{g}$ B) $\frac{v_i^2 \sin\theta}{g}$
C) $\frac{2v_i \sin\theta}{g}$ ✓ D) $\frac{v_i^2}{g}\sin\theta$

Q.7 **If the velocity of the body changes by equal amount in equal intervals of time, the body is said to have:**
A) variable acceleration B) uniform velocity
C) uniform acceleration ✓ D) negative acceleration

Q.8 **In order to determine the maximum height of the projectile, the equation of motion used is**
A) $aS = v_i^2 - v_i^2$ B) $2S = a\left(v_f^2 - v_f^2\right)$
C) $2aS = v_f^2 - v_i^2$ ✓ D) $aS = \left(v_f^2 - v_i^2\right)$

Q.9 **If a force of 12 N acts on a car and changes its momentum from 36 kgm/sec to 60 kgm/sec, the time during which this change occurs will be**
A) 24 sec B) 12 sec
C) 2 sec ✓ D) 8 sec

Q.10 **Which one of the following is a non-conservative force?**
A) Electric force B) Gravitational force
C) Elastic spring force **D) Frictional force ✓**

Q.11 **Value of escape velocity for the surface of the earth is 11 km/sec. Its value for surface of the moon is**
A) 11 km/sec **B) 2.4 km/sec ✓**
C) 10.4 km/sec D) 4.3 km/sec

Q.12 **On a clear day at noon, the intensity of solar energy reaching the earth's surface is about**
A) 1.0 kWm^{-2} ✓ B) 1.0 Wm^{-2}

Q.13 **When a lift is accelerated upward, the apparent weight of an object in it will be**
A) Equal to its real weight B) Zero
C) Less than its real weight **D) Greater than its real weight ✓**

Q.14 **The moment of inertial of a thin rod is**
A) $\frac{1}{2}mL^2$ B) $\frac{1}{12}mL$

C) $\frac{1}{4}m^3L$

D) $\frac{1}{12}mL^2$ ✓

Q.15 In elastic collision, when a massive body collides with light body at conditions m1 >> m2 and v2 = 0 ms^{-1}, then the change in velocity will be written as:

A) $v_1' \approx -v_1 ; v_2' \approx v_1$

B) $v_1' \approx v_1 ; v_2' \approx 2v_1$ ✓

C) $v_1' \approx v_1 ; v2' \approx 0$

D) $v_1' \approx -v_1 ; v_2' \approx 0$

Fluid Dynamics

Q.1 Conservation of mass of fluid flow leads to

A) Bernoulli's equation

B) Equation of motion

C) Venturi meter

D) Equation of continuity ✓

Q.2 The blood vessels collapse when

A) External pressure applied becomes greater than the systolic pressure ✓

C) External pressure applied is equal to systolic pressure

B) External pressure applied is less than the systolic pressure

D) External pressure applied is zero

Q.3 In Millikan's Method, the radius of droplet can be calculated by:

A) $r = \sqrt{\frac{qv_t}{2\rho g}}$

B) $r^2 = \frac{9\eta v_t}{2\rho g}$ ✓

C) $r^2 = \frac{q\eta v_t}{\rho g}$

D) $r = \frac{9\eta v_t}{2\rho g}$

Q.4 A tiny droplet of oil of density 'ρ' and radius 'r' falls through air under force of gravity. If viscosity of air is 'η', the terminal velocity acquired by the oil drop is given by:

A) $v_t = \frac{4gr^2\rho}{9\eta}$

B) $v_t = \frac{2gr^2\rho}{9\eta}$ ✓

C) $v_t = \frac{9\eta r^2\rho}{4g}$

D) $v_t = \frac{9\eta r^2\rho}{2g}$

Q.5 Torricelli's theorem be written as:

A) $v_2 = \sqrt{2g(h_1 - h_2)}$ ✓

B) $v_2 = \sqrt{2g(h_2 - h_1)}$

C) $v_2 = \sqrt{g(h_2 - h_1)}$

D) $v_2 = \sqrt{g(h_1 - h_2)}$

Q. 6 A pipe varies uniformly in diameter from 2 m to 4 m. An incompressible fluid enters the pipe with velocity 16m/sec. What is velocity of fluid when it leaves the pipe?

A) 64 m/sec.

B) 8 m/sec.

C) 32 m/sec.

D) 4 m/sec. ✓

Q.7 The drag force decreases as the speed of an object moving through fluid _____

A) Increases.

B) Remains constant.

C) Decreases. ✓

D) Both B and C.

Q.8 An object having spherical shape of radius 'r' experiences a retarding force F from a

fluid of co-efficient of viscosity 'η' when moving through the fluid with speed 'v'. What is the ratio of retarding force to speed?

A) $6\pi\eta r^2$
B) $6\pi\eta r$
C) $6\pi\eta/r^2$ ✓
D) $6\pi\eta/r$

Q.9 When the drag force is equal to the weight of the droplet, the droplet will fall with:

A) High Speed
B) Certain acceleration
C) Low Speed
D) Constant Speed ✓

Q.10 The density of blood is:

A) Less than water
B) Greater than water
C) Nearly equal to water ✓
D) Three times that of water

Q.11 Stokes' Law for steady motion in a fluid of infinite extent is given by

A) $F = 6\pi\eta rv$ ✓
B) $F = 6\pi\eta r^2\rho$
C) $F = (4/3)\pi r^3\rho g$
D) $F = 2gr^2\rho/9\eta$

Q.12 If speed of efflux through a small hole in a large tank is 9.8 m/s. Find the height at the fluid above the hole

A) 1 m
B) 4.9 m ✓
C) 9.8 m
D) 19.6 m

Q.13 Flow speed of the fluid through a non-uniform pipe increases from 1 m/sec to 3 m/sec. If change in P.E. is zero, then pressure difference between two points will be: (density of the fluid = 1000 kg/m^3)

A) 1000 N/m^2
B) 8000 N/m^2
C) 9000 N/m^2
D) 4000 N/m^2 ✓

Q.14 Stokes' Law is given as:

A) $F = 6\pi\eta r^2 v$
B) $F = 6\pi\eta rv^{-1}$
C) $F = 6\pi\eta rv$ ✓
D) $F = 6\pi^2\eta r^3 v$

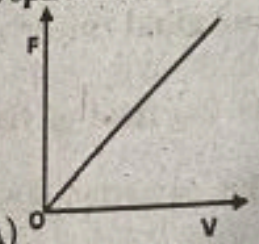
Q.15 The product of cross-sectional area of the pipe and the fluid speed at any point along the pipe:

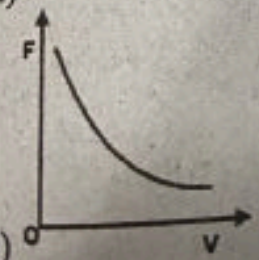
A) Remains constant ✓
B) Exponentially increases
C) Is zero
D) Exponentially decreases

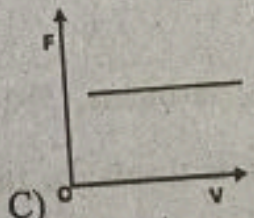
Q.16 A small leak is developed in a large water storage tank. If the height of water above leakage is 10 m, then find the speed of efflux through the leak:

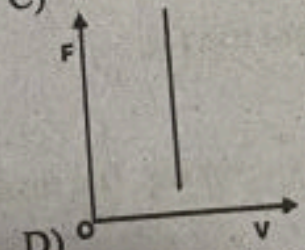
A) 14 m/sec ✓
B) 9.8 m/sec
C) 10 m/sec
D) 20 m/sec

Q.17 Which of the following is the best graphical representation between drag force 'F' on a spherical object of radius 'r' and its speed 'v' through a fluid of viscosity 'η'?

A)


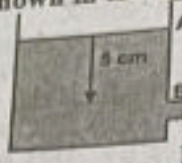
B)


C)


D)


Q.18 What is the speed of an incompressible non-viscous liquid flowing out from 'B'

contained in a container as shown in the figure? Where AB = 5 m and g = 10 m/s².



A) 5 m/s
B) 2 m/s
C) 10 m/s✓
D) 50 m/s

Q.19 For the horizontal pipe, the fluid inside it is flowing horizontally then Bernoulli's equation can be written as

A) $P + \rho v^2$ = constant
B) $P + 2\rho v^2$ = constant
C) $2P + \rho v^2$ = constant✓
D) $2P + 2\rho v^2$ = constant

Q.20 In fluid flow, for the equation of continuity A1v1 = A2v2. If velocity of the fluid at one end is doubled, then what will be the cross-sectional area at this end?

A) Double
B) $(Half)^2$
C) Half✓
D) $(Double)^2$

Q.21 Mass flow per second of the fluid is given by:

Light

Q.1 In Newton ring apparatus, at the point of contact of the lens and glass plate, the additional path difference introduced is

A) λ/4
B) λ
C) λ/2✓
D) λ/3

Q.2 In the case of a grafting spectrometer, the resolving power 'R' of the grating is defined as

A) λ / Δλ✓
B) λ / λ1
C) λ / D
D) N x m

Q.3 Which one of the following lights travels fastest in optical fibers?

A) Visible light
B) Ordinary light
C) Ultraviolet light
D) Invisible infrared light✓

Q.4 In Young's Double Slit Experiment, if the distance between slits and screen is doubled, then fringe spacing becomes:

A) Zero
B) Doubles of the original value✓
C) One
D) Half of the original value

Q.5 In Michelson's interferometer 792 bright fringes pass across the field of view when its movable mirror is displaced through 0.233 mm using the equation $I = m\frac{\lambda}{2}$ the wavelength of light used is:

A) 588 nm✓
B) 348 nm
C) 620 nm
D) 400 nm

Q.6 In Michelson's Experiment, the formula to calculate the speed of light is:

A) c = 2 fd
B) $c = \frac{16f}{d}$

C) $c = \frac{2\pi f}{d}$ D) $c = 16\ fd$ ✓

Q.7 **The information received at the other end of a fibre can be inaccurate due to _____ of the light signal.**
A) Longer wavelengths B) Intensity
C) Frequency **D) Dispersion or Spreading** ✓

Q.8 **The centre of Newton rings is dark due to:**
A) Polarization. B) Constructive interference.
C) Destructive interference. ✓ D) Reflection.

Q.9 **Which of the following lights travels the fastest in optical fibres?**
A) Visible light. B) Ultra-violet.
C) Invisible infra-red. ✓ D) Ordinary light.

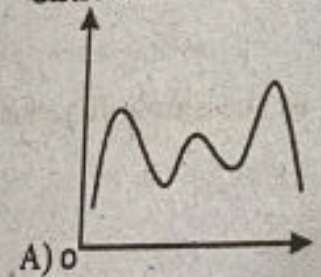
Q.10 **A single mode step index fibre has core of about _____ μm diameter**
A) 50 to 1000. B) 30.
C) 50. **D) 5.** ✓

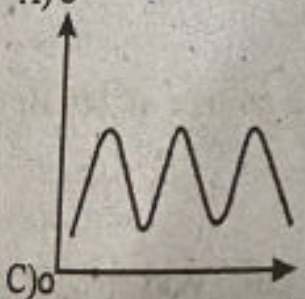
Q.11 **A watch maker uses _____ to repair the watches.**
A) Telescope. **B) Convex lens.** ✓
C) Convex mirror. D) Concave lens.

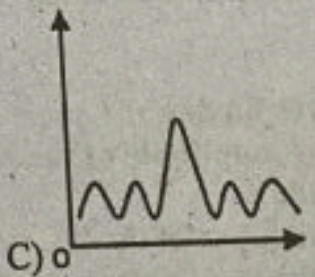
Q.12 **The ratio of the _____ is called magnification.**
A) Image size to object size. ✓ B) Eyepiece size to object size.
C) Object size to image size. D) None of these

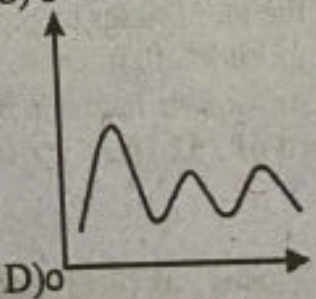
Q.13 **A yellow light of wavelength 500 mm emitted by a single source passes through two narrow slits 1 mm apart. How far apart are two adjacent bright fringes when interference is observed on a screen 10 m away?**
A) 5 mm. ✓ B) 0.5 mm.
C) 1.33 mm. D) 50 mm.

Q.14 **A monochromatic light of wavelength 'λ' is used to produce the diffraction pattern through a single slit of width X. Which one of the following represents the intensity distribution across the screen?**

A) 

C) 

C) 

D) 

Q.15 **For interference of light waves to take place, the required condition is**
A) The path difference of the light waves from the two sources must be large
C) The interfering waves must be non-coherent

B) The light waves may come from different sources
D) The light waves must come from two coherent sources✓

Q.16 The property of bending of light around an obstacle and spreading of light waves into geometric shadow of an obstacle is called:
A) Diffraction of Light✓
B) Quantization of Light
C) Polarization of Light
D) Interference of Light

Q.17 The normal human eye can focus a sharp image of an object on the eye if the object is located at certain distance called
A) Least Point
B) Far Point
C) Near Point✓
D) Distinct Point

Q.18 Polarization of light exhibited the nature of light as
A) Longitudinal wave
B) Transverse wave✓
C) Compressional wave
D) Electromagnetic wave

Q.19 The concentration of a sugar solution can be determined by
A) Un-polarized light
B) Interference of light
C) Plane polarized light✓
D) Diffraction of light

Q.20 The information from one place to another can be transmitted very safely and easily by:
A) Copper wire
B) Photodiode
C) Aluminium wire
D) Optical fibre✓

Waves

Q.1 An oscillating body is at mean position at t = 0. At t = T/4 it will be at
A) Extreme position✓
C) Mean position
B) Between extreme and mean position
D) Beyond extreme position

Q.2 In a simple pendulum, the tension of the string is
A) $g \cos \theta$
B) $mg \cos \theta$✓
C) $mg \sin \theta$
D) mg

Q.3 Two sound waves having the same amplitudes are moving in the same direction are out of phase. The amplitude of the resultant wave is
A) Zero amplitude✓
C) The sum of amplitude of the two waves
B) Difference of the amplitudes of the two waves
D) Double the amplitude of either wave

Q.4 A source 'Y' of unknown frequency produces 4 beats with a source of 240 Hz and 8 beats with a sound of 252 Hz. Frequency of the source 'Y' is
A) 244 Hz✓
C) 236 Hz
B) 248 Hz
D) 246 Hz

Q.5 An organ pipe closed at one end has a length of 25 cm. Wavelength of the fundamental note is
A) 25 cm
C) 50 cm
B) 100 cm✓
D) 75 cm

Q.6 The path difference 'BD' for destructive interference is
A) $(m + \frac{1}{2})\lambda$ ✓ B) $d \sin\theta$
C) $m\lambda$ D) 3λ

Q.7 Two waves of slightly different frequencies and traveling in same direction produce _____
A) Interference. B) Stationary waves.
C) Polarization. **D) Beats.** ✓

Q.8 What is it that we use to calculate the speeds of distant stars and galaxies?
A) Doppler Effect ✓ B) Beats
C) Interference D) All of the above

Q.9 If the mass attached with a spring becomes four times, the time period of vibration becomes:
A) One fourth B) Half
C) 3/4 **D) Double** ✓

Q.10 Speed of the waves is equal to:
A) $f\lambda$ **B) Both A and B** ✓
C) $\frac{\lambda}{T}$ D) λT

Q.11 In R-L Series circuit, the phase difference between applied voltage and current is given by the angle Θ which is:
A $\theta = \tan^{-1}\frac{LR}{\omega}$ **B)** $\theta = \tan^{-1}\frac{\omega}{g}$ ✓
C) $\Theta = \tan^{-1}\omega LR$ D) $\theta = \tan^{-1}\frac{\omega R}{L}$

Q.12 A standing wave pattern is formed when the length of string is an integral multiple of _____ wavelength.
A) Triple. **B) Half.** ✓
C) Full. D) Double.

Q.13 The angular frequency of simple pendulum is directly proportional to _____
A) l. B) v l.
C) 1/l. **D) v1/l.** ✓

Q.14 Two waves of slightly different frequencies and travelling in the same direction lead to:
A) Stationary Waves **B) Beats** ✓
C) Interference D) Both B and C

Q.15 In gases, the speed of sound is inversely proportional to _____ of the density when other factors are same.
A) Square root. ✓ B) Third power.
C) Square. D) Third root.

Q.16 A 2m long pipe is open at both ends. What is its harmonic frequency?
A) 42.5 Hz. B) 220 Hz.
C) 85 Hz. ✓ D) None of these.

Q.17 At high temperature, the proportion of _____ wavelength radiation increase.

A) AM radio.
B) Shorter.
C) Long radio.
D) Both A and C.✓

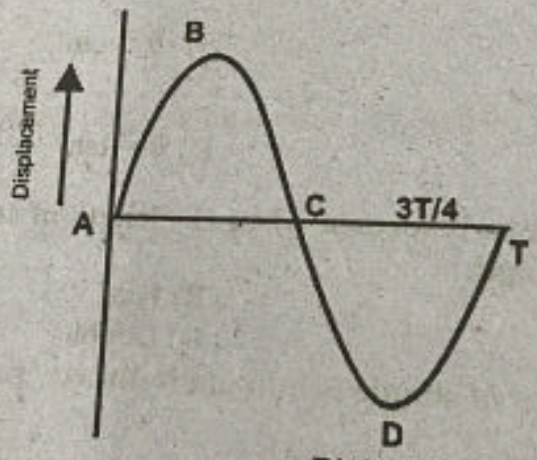
Q.18 Transverse waves cannot be setup in _____
A) Metals.
B) Fluids.✓
C) Solids.
D) Soil.

Q.19 A source of sound wave emits waves of frequency 'f'. If 'v' is speed of sound waves, then what will be the wavelength of the waves
A) $\frac{v}{f}$ ✓
B) $\frac{v - u_o}{f}$
C) vf
D) $(v - u_o)f$

Q.20 The spectrum of a star's light is measured and the wavelength of one of the lines at the sodium's line is found to be 589 nm. The same line has the wavelength of 497 nm when observed in the laboratory. This means the star is
A) Moving away from the earth✓
B) Stationary
C) Moving towards the north
D) Revolving around the planet

Q.21 What is the period of mass spring system during SHM if the ratio of mass to spring constant is ¼?
A) π✓
B) $1/\pi$
C) 2π
D) $\frac{1}{2}\pi$

Q.22 Waveform of SHM is given in figure. At what time/times displacement is equal to zero?

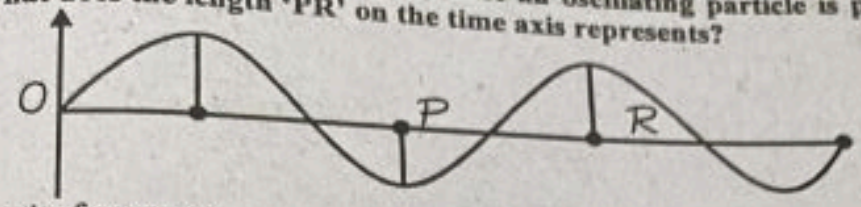


A) T/4 only
B) 0, T/4, 3T/4 and T
C) 3T/4 only
D) 0, T/2 and T✓

Q.23 A simple harmonic oscillator has a time period of 10 seconds. Which equation rotates its acceleration 'a' and displacement 'x'?
A) $a = -2x$
B) $a = -\left(\frac{2\pi}{10}\right)^2 x$ ✓
C) $a = -(20\pi)\times$
D) $a = -(20\pi)^2 \times$

Q.24 When the length of a simple pendulum is doubled, find the ratio of the new frequency to the old frequency?
A) 1/4
B) $\sqrt{2}$
C) 1/2
D) $1/\sqrt{2}$ ✓

Q.25 In the diagram below, the displacement of an oscillating particle is plotted against time. What does the length 'PR' on the time axis represents?



A) Twice the frequency
B) Half the frequency
C) Half the period ✓
D) Twice the period

Q.26 When the source of sound moves towards the stationary observer, the value of apparent frequency 'fo' is:

A) $f_o = \left(\frac{v+u_i}{v}\right)f$
B) $f_o = \left(\frac{v}{v+u_i}\right)f$
C) $f_o = \left(\frac{v}{v-u_i}\right)f$ ✓
D) $f_o = \left(\frac{v-u_i}{v}\right)f$

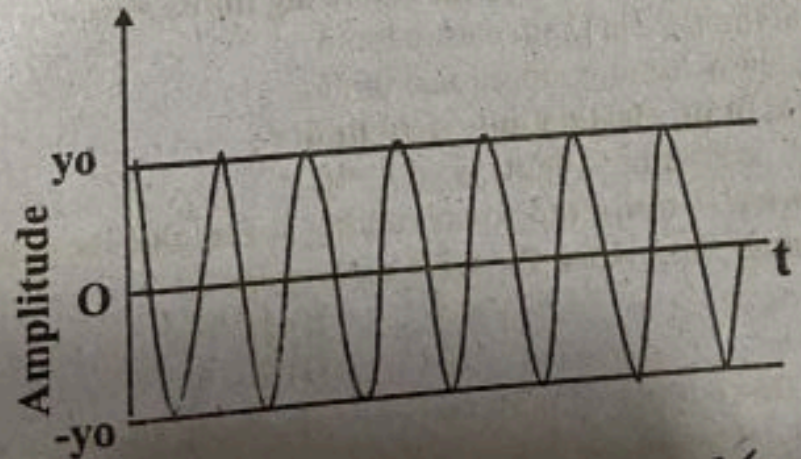
Q.27 For vibrating mass-spring system, the expression of kinetic energy at any displacement 'x' is given by:

A) $\frac{1}{2}kx_o^2\left(1-\frac{x^2}{x_o^2}\right)$
B) $\frac{1}{2}m\omega\left(1-\frac{x^2}{x_o^2}\right)$
C) $\frac{1}{2}kx_o^2$
D) $\frac{1}{2}m\omega^2x_o$ ✓

Q.28 Speed of sound through a gas is measured as 340 m/s at pressure P1 and temperature T1. What will be the speed of sound if pressure of gas is doubled but temperature is kept constant?

A) 342 m/s ✓
B) 170 m/s
C) 340 m/s
D) 680 m/s

Q.29 Variation of amplitude with respect to time for an oscillation object is shown in figure.



Identify the oscillation:

A) Damped
B) Undamped ✓
C) Critical
D) Heavily damped

Q.30 **In a simple harmonic motion with a radius 'xo', the velocity of the particle at any point is:**

A) $v = \omega\sqrt{x_o^2 - x^2}$
B) $v = \omega\sqrt{x_o - x}$
C) $v = \omega(x^2 - x_o^2)$ ✓
D) $v = \omega\sqrt{x - x_o}$

Deformation of Solids

Q.1 **Which of the following is the most ductile?**

A) Glass.
B) Cast iron.
C) Copper. ✓
D) High carbon steel.

Q.2 **A wire is stretched by a force which causes an extension. The energy is stored in it only when:**

A) The extension of wire is proportional to force applied ✓
C) The cross-section area of the wire remains constant
B) The wire is not stretched beyond its elastic limit
D) The weight of wire is negligible

Q.3 **Which statement is correct:**

A) Elasticity is that property of body which enables body to regain its original dimension
C) Elasticity is that property of a body that does not allow it to return to its original shape
B) Elasticity is that property of a body that allows it to retain its original shape and dimension after the stress ✓ is removed.
D) Elasticity is that property of a body that obeys Hooke's law.

Q.4 **The ratio of tensile strength to tensile strain is called**

A) Modulus of elasticity
B) Young's Modulus ✓
C) Bulk Modulus
D) Shear Modulus

Q.5 **A wire is stretched by a force 'F' which causes an extension Δl, the energy stored in the wire is:**

A) $F\Delta l$
B) $\frac{1}{2} F\Delta l^2$
C) $2F\Delta l$
D) $\frac{1}{2} F\Delta l$ ✓

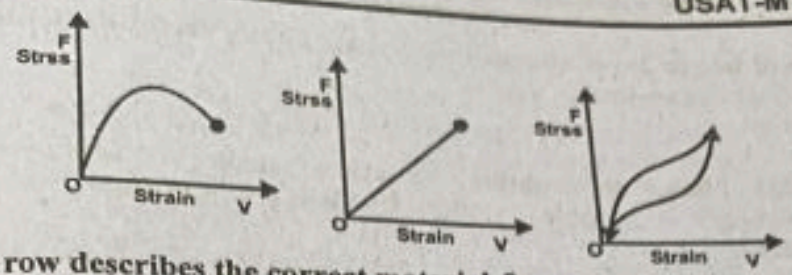
Q.6 **The stress-strain graph, deduced the following limits successively:**

A) Proportional limit, yield limit, elastic limit
C) Yield limit, elastic limit, proportional limit
B) Proportional limit, elastic limit, yield limit ✓
D) Elastic limit, proportional limit, yield limit

Q.7 **A 4.0 m long wire is subjected to stretching force and its length increases by 40 cm. The percent elongation which the wire undergoes is:**

A) 0.10 %
B) 10 % ✓
C) 40 %
D) 20 %

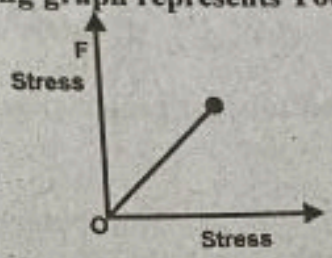
Q.8 **Three graphs for three types of materials are shown in the figure.**



Which row describes the correct materials?

	X	Y	Z
A)	Brittle	Ductile	Polymer
B)	Brittle	Polymer	Ductile
C)	Polymer	Brittle	Ductile
D)	**Ductile**	**Brittle**	**Polymer✓**

Q.9 **Which feature of the following graph represents Young's Modulus?**



A) Area under graph
C) Gradient of the graph
B) Reciprocal of the gradient✓
D) Product of gradient and area of the curve.

Q.10 **Strain energy in a deformed energy is stored in the form of:**
A) Elastic Energy
B) Plastic Energy
C) Potential Energy✓
D) Kinetic Energy

Q.11 **A wire of area of cross section 'A' and original length 'l' is subjected to a load 'L'. A second wire of same material with an area is '2A' and length '2l' is subjected to the same load 'L'. If the extension in first wire is 'X' and second wire is 'Y', find the ratio 'X/Y'.**

A) $\frac{1}{4}$
B) $\frac{1}{1}$ **✓**
C) $\frac{1}{2}$
D) $\frac{1}{1}$

Q.12 **The ratio of applied stress to the volumetric strain is called:**
A) Bulk Modulus✓
B) Tensile modulus
C) Shear Modulus
D) Young's Modulus

Q.13 **The wire made of copper belong to which specific kind of material:**
A) Ductile material✓
B) Brittle material
C) Tough material
D) Deformed material

Q.14 **A 1.25cm diameter cylinder is subjected to load of 2500kg, stress on bar is:**
A) 200 Pa
B) 2×10^6 Pa
C) 2×10^5 **Pa✓**
D) 2×10^9 Pa

Q.15 A wire of length 2m is attached with mass of 5kg vertically, tensile strain of wire is 0.3×10^{-3}, the extension in wire is:
A) 1.5 mm
B) 0.5 mm
C) 2mm
D) 0.6 mm✓

Q.16 In the case of linear deformation, the ratio of tensiles stress to tensile strain is called:
A) young's double slit phenomenon
B) Young's modulus✓
C) Bulk modulur
D) energy stored in stretched wire

Q.17 Which material will follow the below stress strain curve:

DIA

A) Iron
B) Lead
C) Glass✓
D) Copper

Q.18 The sum of all forms of molecular energies (Kinetic and potential) of a substance is termed as?
A) Elastic energy
B) Internal energy✓
C) Absolute energy
D) Heat energy

Q.19 The area under the extension-load graph of an elastic material whose elastic limit has not been exceeded gives its:
A) Stress
B) Strain
C) Strain energy✓
D) Young modulus

Q.20 A wire has a spring cosant of 5×10^4 N m^{-1}. It is stretched by a force to extension of 1.4 mm. Calculate the strain energy stored in the wire.
A) 4.9×10^{-5} J
B) 4.9 J
C) 4.9×10^{-2} J✓
D) 4.9×10^{-5} J

Ideal Gases

Q.1 The value of universal; Gas Constant 'R' is:
A) 8.314 $Jmol^{-2}K^{-1}$
B) 1.38 $Jmol^{-1}K^{-1}$
C) 1.38 $Jmol^{-1}K^{-2}$
D) 8.314 $Jmol^{-1}K^{-1}$✓

Q.2 Which one of the following compounds show cis-trans isomerism?
A) 1-butene
B) 1-bromo-2-chloropropane✓
C) 1-hexene
D) Propene

Q.3 Which of the following is the expression of root mean square speed of a gas having n number of molecules contained in the container?

A) $\sqrt{\frac{v_1^2 + v_2^2 + ... + v_x^2}{N}}$ ✓

B) $\sqrt{\frac{v_1 + v_2 + ... + v_x}{N}}$

C) $\frac{v_1^2 + v_2^2 + ... + v_x^2}{N}$

D) $\frac{v_1 + v_2 + ... + v_x}{N}$

Q.4 For a gas of volume V in its equilibrium state, if the pressure does change with time then total kinetic energy of gas is constant because
A) Collisions between gas molecules occur

C) Collisions between gas molecules occur linearly
B) Collisions must be elastic✓ D) Collisions must be inelastic

Q.5 **H_2 and O_2 both are at thermal equilibrium at temperature 300 K. Oxygen molecule is 16 times massive than hydrogen. Root mean square speed of hydrogen is**
A) 4 root mean square of oxygen✓ B) 1/16 root mean square of oxygen
C) ¼ root mean square of oxygen D) 1/6 root mean square of oxygen

Q.6 **Which of the following is expression of mean square speed of 'N' gas molecules contained in a cylinder?**

A) $\frac{v_1+v_2+.....+v_x}{N}$ ✓ B) $\sqrt{\frac{v_1+v_2+.....+v_x}{N}}$

C) $\frac{v_1^2+v_2^2+.....+v_x^2}{N}$ D) $\sqrt{\frac{v_1^2+v_2^2+.....+v_x^2}{N}}$

Q.7 **What is the value of universal gas constant?**
A) 8314 $Jmol^{-1}K^{-1}$ C) 831.4 $Jmol^{-1}K^{-1}$ **B) 83.14 $Jmol^{-1}K^{-1}$✓** D) 8.314 $Jmol^{-1}K^{-}$

Q.8 **A gas sample contains three molecules each having speed 1 ms^{-1}, 2 ms^{-1}, 3 ms^{-1}. What is the mean square speed?**
A) 14/3 m/s✓ B) 2 m/s
C) 6 m/s D) $\sqrt{14/3}$m/s

Q.9 **A gas containing 'N' number of molecules of a gas having mass of each molecule 'm' is in a cubic container having length of each side 'a'. What is the density of gas contained in cube?**
A) N/a^2 **B) Nm/a^3✓**
C) m/a^3 D) Na^3/m

Q.10 **In 'General Gas Equation PV=nRT', 'n' represents the number of moles of gas. Which of the following represents the relation of 'n'?**
A) $n = NN_A$ B) $n = N_A/N$
C) $n = N/N_A$✓ D) $n = N + N_A$

Q.11 **Two sample of gases '1' and '2' are taken at same temperature and pressure but the ratio of number of their volume is V1:V2 = 2:3. What is the ration of number of moles of the gas sample?**
A) 3:2 C) 4:9 B) $\sqrt{2}:\sqrt{3}$ **D) 2:3✓**

Q.12 **Root mean square velocity of a gas having pressure 'P' and density 'ρ' is given by:**
A) $\sqrt{\frac{3P}{\rho}}$ ✓ C) $\sqrt{\frac{3\rho}{P}}$ B) $\frac{3P}{\rho}$ D) $\frac{3\rho}{P}$

Q.13 **The relation $\frac{R}{N_A} = 1.38 \times 10^{-25}$ JK^{-1} in a gas law is known as:**
A) Avogadro's constant B) Newton's constant
C) Charles constant **D) Boltzmann's constant✓**

Q.14 **The relation 'PV = nRT' shows which law of physics:**
A) Charles Law B) Newton's Constant
C) Avogadro's Law **D) Ideal Gas Law✓**

Heat and Thermodynamics

Q.1 The value of Wien's constant is
A) 2.90×10^{-3} mK✓
B) 4.22×10^{-7} mK
C) 3.34×10^{-4} mK
D) 3.42×10^{-8} mK

Q.2 The turbine in a steam power plant takes steam from a boiler at 427 °C and exhausts into a low temperature reservoir at 77 °C. What is the maximum possible efficiency?
A) 50%✓
B) 60%
C) 40%
D) 70%

Q.3 Which one is not an irreversible process?
A) Slow compression of a gas into a cylinder
C) Changes due to friction✓
B) Explosion
D) Dissipation of energy

Q.4 The value of Stefan's Boltzmann Constant is:
A) 4.28×10^{-7} $Wm^{-2}K^{-4}$
B) 3.62×10^{-4} $Wm^{-2}K^{-4}$
C) 4.28×10^{-4} $Wm^{-2}K^{-4}$
D) 5.67×10^{-5} $Wm^{-2}K^{-4}$✓

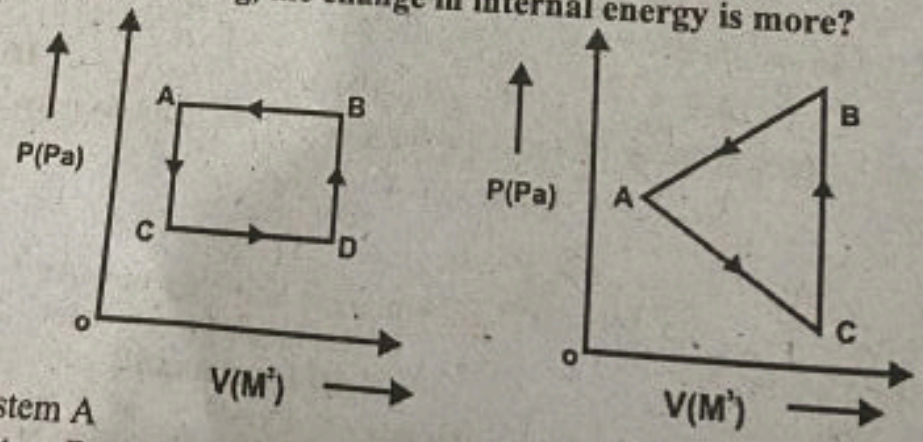
Q.5 The pressure on the other sides and everywhere inside the vessel will be according to the:
A) Pascal's Law✓
B) Boyle's Law
C) Hook's Law
D) Charles's Law

Q.6 The value of universal gas constant is 17
A) 8.314 $Jmol^{-1}K^{-1}$✓
B) 7.23 $Jmol^{-1}K^{-1}$
C) 8.324 $Jmol^{-1}K^{-1}$
D) 1.00 $Jmol^{-1}K^{-1}$

Q.7 For adiabatic process, the First Law of Thermodynamics is:
A) $W = \Delta U + Q$
B) $Q = W$
C) $Q = -W$
D) $W = -\Delta U$✓

Q.8 The entropy of the universe always:
A) Decreases
B) Remains the same
C) Increases✓
D) Both A and B

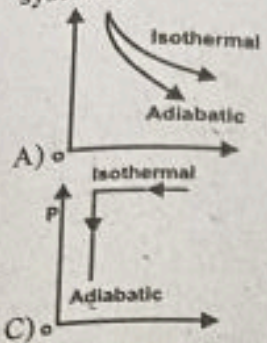
Q.9 In which of the following, the change in internal energy is more?

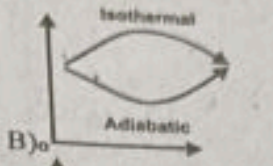


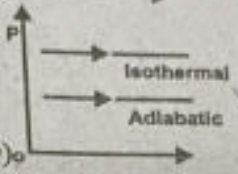
A) In system A
B) Cannot be predicted
C) In system B
D) Change is zero in both. (both are cycliB) ✓

Q.10 Pressure volume graph of two systems 'A' and 'B' are plotted under isothermal and

adiabatic conditions. Which of the following observation of graph represents the two systems?

A)


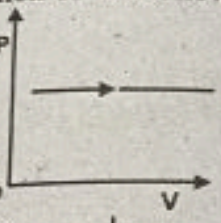
B)


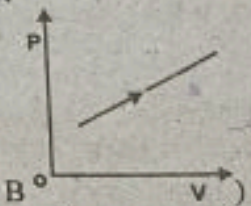
C)


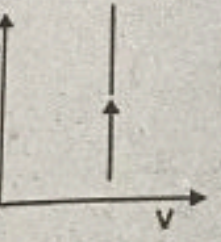
D)

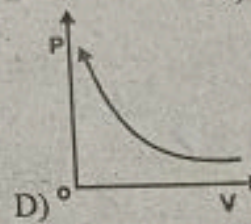
Answer: A

Q.11 Which of the following curve is an isotherm?

A)


B)


C)


D)


Answer: D

Q.12 If 'Q' is the amount of heat supplied to a system and 'W' is the work done, then change in internal energy can be defined as

A) Q/W
B) W/Q
C) Q – W✓
D) 1 + Q/W

Q.13 A heat engine operating according to second law of thermodynamics rejects one fourth of the heat taken from high temperature reservoir. What is the percentage efficiency of heat engine?

A) 100%
B) 50%
C) 25%
D) 75%✓

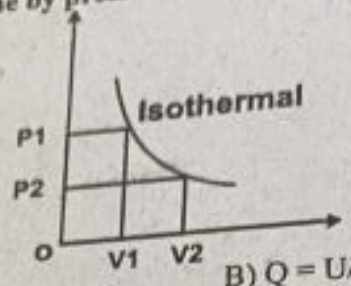
Q.14 First law of thermodynamics under adiabatic conditions can be mathematically written as:

A) Q = W
B) Q = U + W
C) Q = ΔU
D) W = –ΔU✓

Q.15 What is the factor upon which change in internal energy of an ideal gas depends?

A) Change in volume
C) Change in temperature and volume
B) Change in temperature✓
D) Path followed to change internal energy

Q.16 What will be the mathematical form of first law of thermodynamics for a system whose variation of volume by pressure is shown?



A) $Q = U$
B) $Q = U/W$
C) $U = W$
D) $Q = W$✓

Q.17 For a heat engine 'A' ratio of Q1 to Q2 is 2/3 while that of heat engine 'B', ratio of Q2 to Q1 is 1/3. What is the value $\eta A : \eta B$?

A) 1:3
B) 2:3
C) 1:2✓
D) 2:1

Q.18 At triple point of water, the pressure of gas is 2680 Pa, by changing 'T' the pressure increases to 4870 Pa. Then 'T' is:

A) 496.38 K✓
B) Zero
C) 438.96 K
D) 496.38 °F

Electronics

Q.1 The grid in the cathode ray oscilloscope _____.

A) Controls number of waves
C) Controls the brightness of spot formed✓
B) Accelerates electrons
D) Has positive potential with respect to cathode

Q.2 In transistors, the base region is very thin, of the order of

A) 10^{-5} cm
B) 10^{-6} mm
C) 10^{-6} m✓
D) 10^{-6} μm

Q.3 The closed loop gain of OP-AMP depends on

A) Internal structure of OP-AMP
B) Voltage of power supplies
C) Externally connected resistances✓
D) Input resistance

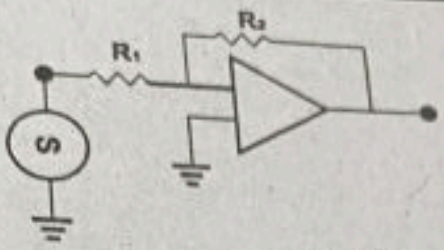
Q.4 The net charge on an N-type substance is

A) 0.7 volts✓
B) 0.25 volts
C) 0.3 volts
D) 0.07 volts

Q.5 The substances like germanium and silicon have

A) Negative temperature coefficients✓
B) Both A and B
C) Positive temperature coefficients
D) None of the above

Q.6 If $R1 = 10\ k\Omega$ and $R2 = 100\ k\Omega$ then the gain of op-amplifier as inverting amplifier is:



A) −1
B) −10✓
C) 10
D) 1

Q.7 If inputs A = 1, B = 0 and output X = 1, then it corresponds to the operation of a:
A) AND Gate
B) XNOR Gate
C) NAND Gate✓
D) NOR Gate

Q.8 In a certain circuit, if the transistor has a collector current of 10 mA and base current of 50 μA, then the current gain of the transistor is:
A) 250
B) 150
C) 100
D) 200✓

Q.9 A signal that is applied at the inverting input terminal of an op-amplifier undergo amplification, at the output terminal with a phase shift of:
A) 0°
B) 360°
C) 270°
D) 180°✓

Q.10 To convert the Si crystal into p-type semi-conductor, which group element will be doped:
A) Trivalent Element✓
B) Fourth Group Element
C) Second Group Element
D) Pentavalent Element

Q.11 In which of the following, output is similar to NAND gate if input A=0 and input B=1.
A) NOR.
B) XOR.✓
C) XNOR.
D) Both B and C.

Q.12 In LED when an electron combines with a _____ during forward bias conduction, a photon of visible light is emitted.
A) High voltage.
B) Hole.✓
C) Photon.
D) Positron.

Q.13 Practically _____ current flows in a reverse biased p-n junction.
A) No.
B) Few milliamperes.
C) Very large.
D) Both A and C.✓

Q.14 Cesium coated oxidized silver emits electrons for _____ light.
A) Infrared.✓
B) Visible.
C) Ultraviolet.
D) Green.

Q.15 Which device is the most efficient?
A) Nuclear reactor.✓
B) Silicon solar cell.
C) Storage battery.
D) Dry battery cell.

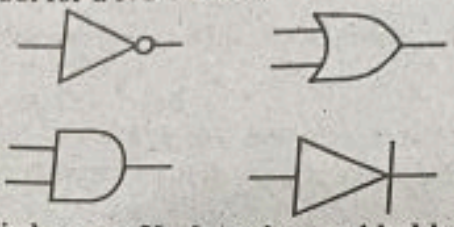
Q.16 An n-type semi-conductor is made by doping silicon crystal with _____
A) Indium.
B) Arsenic.✓
C) Aluminium.
D) Both B and C.

Q.17 Which of the following is the proper way to study the sinusoidal waveform of the

voltage?
A) Voltage is connected to X input and the time base is switched off
C) Voltage is connected to Y input and the time base is switched on✓
B) Voltage is connected to Y input and the time base is switched off
D) Voltage is connected to X input and the time base is switched on

Q.18 Electron gun in cathode ray oscilloscope contains
A) Filament, cathode, grid, anodes✓
B) Emitter, base, collector
C) Cathode, anode, capacitor, screen
D) Resistance, capacitor, inductor

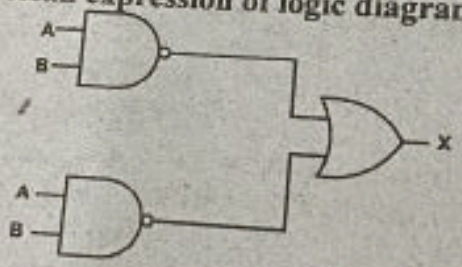
Q.19 What is the logic symbol for a NOT Gate?



Q.20 The voltage that is applied across X-plates is provided by a circuit called
A) Audio generator
B) Signal generator
C) Time base generator✓
D) Linear generator

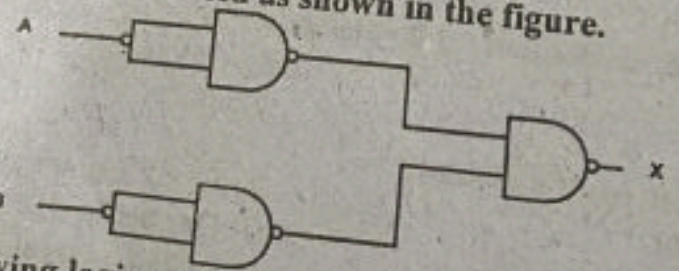
Q.21 Which of the following is the proper way to study the sinusoidal wave form of voltage?
A) Voltage is connected to 'Y' input and time base is switched on.✓
C) Voltage is connected to 'X' input and time base is switched off.
B) Voltage is connected to 'Y' input and time base is switched off.
D) Voltage is connected to 'X' input and time base is switched on.

Q.22 What is the output Boolean expression of logic diagram shown in figure below:



A) $\overline{(A+B)}.\overline{(A+B)}$
B) $\bar{A}.\bar{B}+\bar{A}.\bar{B}$
C) $(\bar{A}+\bar{B})(\bar{A}+\bar{B})$
D) $\overline{AB}+\overline{AB}$ ✓

Q.23 Three NAND gates are connected as shown in the figure.



Which of the following logic gate is formed in the connected circuit?
A) OR✓
B) NOR
C) AND
D) NAND

Q.24 What is the output of the truth table?

A	B
0	0
1	0
1	1

Output $x = AB + \overline{A}\overline{B}$

A)

X
0
0
1
1

B)

X
1
1
1
0

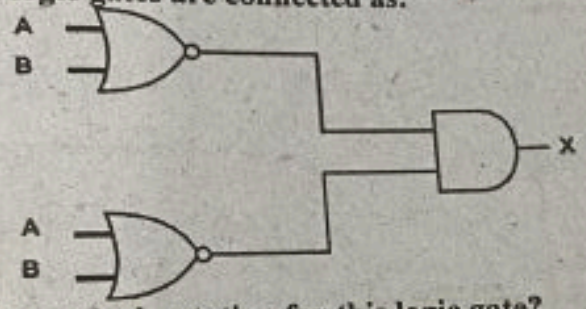
C)

X
1
0
0
1

D)

X
0
1
1
1

Q.25 **If the fundamental logic gates are connected as:**



What are the mathematical notation for this logic gate?

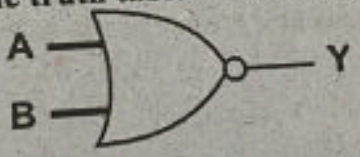
A) $(\overline{A}+B).(A+B)$

B) $\overline{(A+B)}(A+B)$

C) $\overline{(A+B)}.\overline{(A+B)}$ ✓

D) $\overline{AB}+\overline{AB}$

Q.26 **Which of the following is the truth table for the logic gate;**



A)

A	B	Y
0	0	1
0	1	1
1	0	1
1	1	1

✓

B)

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1

C)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

D)

A	B	Y
0	0	0
0	1	1
1	0	1
1	1	0

Q.27 Which one of the following is the Boolean expression of NAND gate?
A) X = A.B
B) X = A.B✓
C) X = A + B
D) X = A + B

Q.28 Which one of the following is the truth table of NAND gate?

A)

A	B	Y
0	0	1
0	1	0
1	0	0
1	1	0

B)

A	B	Y
0	0	0
0	1	0
1	0	1
1	1	0

✓

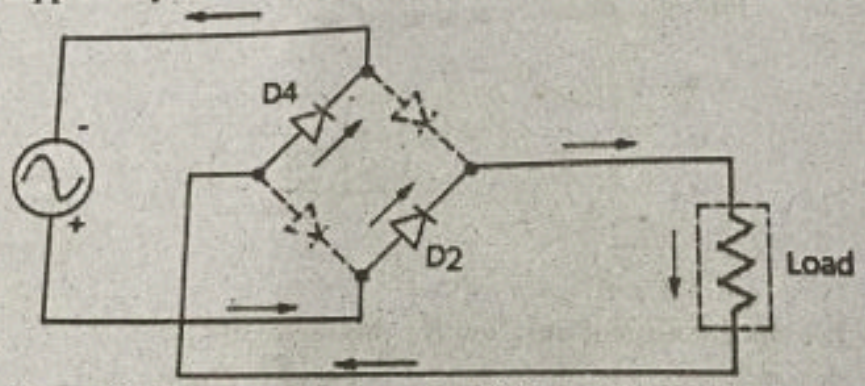
C)

A	B	Y
0	1	1
1	1	0

D)

A	B	Y
0	0	0
1	1	1

Q.29 What happens in positive cycle of AC input?



A) D_1 and D_3 conducts
B) D_3 and D_4 conducts
C) D_1 and D_2 conducts
D) D_2 and D_4 conducts✓

Q.30 If signal is applied to input of non-inverting amplifier through resistance of 100 kOhm, and the value of feedback resistance is 10kOhm, the gain is:
A) 11
B) 1.1✓
C) 10
D) 0.11

Current Electricity

Q.1 The consumption of energy by 60-watt bulb in 2 seconds is:
A) 20 J
B) 30 J
C) 120 J✓
D) 0.02 J

Q.2 Electric intensity is a vector quantity and its direction is
A) Perpendicular to the direction of field
B) At a certain angle
C) Opposite to the direction of force
D) Along the direction of force✓

Q.3 The magnitude of an electric field between two separated plates can be calculated by the relation

A) $\Delta V = Ed$✓

B) $\Delta V = \frac{E}{q_o}$

C) $\Delta V = E/d$

D) $E = \frac{d}{\Delta V}$

Q.4 **SI unit of electric flux is**

A) NmC^{-1}

B) Nm^2C^{-2}✓

C) $Nm^{-2}C^{-2}$

D) Nm^2C^{-2}

Q.5 **The equivalent current which passes from a point at higher potential to a point at a lower potential as if it represented a movement of positive charges is**

A) Electronic current

B) Magnetic lines

C) Electric current

D) Conventional current✓

Q.6 **If 'V' is applied potential difference across a resistance 'R', then loss in potential energy per unit time is**

A) VI

B) $\frac{V^2}{R}$

C) I^2R

D) All of the above✓

Q.7 **The sensitivity of a galvanometer can be decreased by**

A) Increasing magnetic field

B) Increasing $\frac{c}{BAN}$ Ration✓

C) Increasing number of turns of the coil

D) Decreasing length of couple 'c'

Q.8 **The work done in moving a unit positive charge from one point to another against the electric field is a measure of:**

A) Capacitance

C) **Potential difference between two points**✓

B) Intensity of electric field

D) Resistance between two points

Q.9 **The deviation of I-V graph from the straight line is due to:**

A) Decrease in temperature and decrease in resistance

C) **Increase in temperature and increase in resistance**✓

B) Decrease in temperature and increase in resistance

D) Increase in temperature and decrease in resistance

Q.10 **The fractional change in resistance per Kelvin is known as:**

A) **Temperature coefficient of resistance**✓

C) Thermal coefficient

B) Linear coefficient of expansion

D) Volumetric coefficient of expansion

Q.11 **The energy supplied by the cell to the charge carriers is derived from the conversion of:**

A) Heat energy into Electrical energy

C) **Chemical energy into Electrical energy**✓

B) Solar energy into Electrical energy

D) Mechanical energy into Electrical energy

Q.12 What shunt resistance must be connected across a Galvanometer of 20 Ω resistance which gives full scale deflection with 2.0 A current, so as to convert it into an Ammeter of range 10 A?

A) 5 Ω✓ B) 3 Ω
C) 2 Ω D) 4 Ω

Q.13 The current measuring part of the Avometer consists of number of low resistances connected:

A) At an angle of 180° with the galvanometer
C) Parallel with the galvanometer✓
B) At an angle of 45° with the galvanometer
D) Perpendicular to the galvanometer

Q.14 Resistance in RC circuit of time constant 2 seconds is 1000 Ohms. What is value of C in the circuit?

A) 2 μ farad. B) 200 μ farad.
C) 20 μ farad.✓ D) 2000 μ farad

Q.15 The algebraic sum of potential changes in a closed circuit is zero is Kirchhoff's _____ rule.

A) First. B) Third.
C) Second.✓ D) None of these.

Q.16 A 5 Ohm resistor is indicated by a single _____ color band around its body.

A) Red. B) Blue.
C) Green.✓ D) Brown.

Q.17 A wire has resistance 100 Ohm at 0 °C and 200 Ohm at 100 °C. What is its temperature coefficient in K^{-1}?

A) -0.01. B) 0.01.
C) -1/273. **D) 1/273.✓**

Q.18 Which of the following has the highest resistivity?

A) Germanium. B) Copper.
C) Silver. ✓ D) Platinum.

Q.19 If inductance is denoted by L and resistance by R, which of the following is true for a choke?

A) R is large, L is very small. B) Both R and L are large.
C) R is very small, L is large.✓ D) Both R and L are very small.

Q.20 The heat produced by a current I in the wire of resistance R during time interval t is

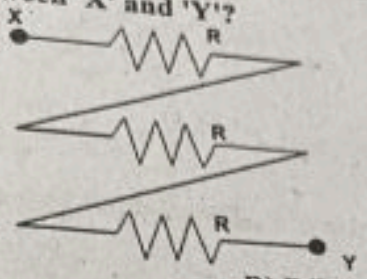
A) I^2/Rt. B) $I^2/R/t$.
C) I^2Rt.✓ D) IR^2t.

Q.21 If 2 A current passes through a resistor when connected to a certain battery. If the resistance is replaced by the double resistance, then the current will become

A) 2 A B) 6 A
C) 4 A **D) 1 A✓**

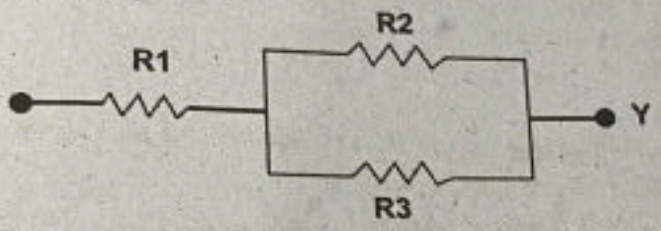
Q.22 Three resistors each having value 'R' are connected as shown in figure. What is the

equivalence resistance between 'X' and 'Y'?



A) 3R✓
B) R/3
C) R
D) R^3

Q.23 Three resistors of resistance R1, R2 and R3 are connected as shown in figure. Equivalence resistance is:



A) $R_1 + R_2 + R_3$

B) $\frac{R_1R_2 + R_2R_3 + R_2R_3}{R_1 + R_2}$ ✓

B) $\frac{R_1 + R_2 + R_3}{R_1R_2}$

D) $\frac{R_1R_2R_3}{R_1R_2}$

Q.24 What will be the effect on the capacitance of a capacitor if area of each plate is doubled while separation between the plates is halved?

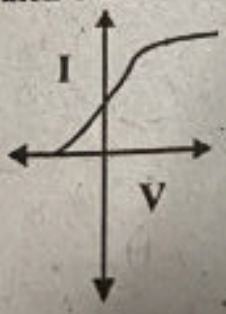
A) Capacitance remains same
B) Capacitance becomes four times✓
C) Capacitance becomes double
D) Capacitance reduces to half

Q.25 10 V potential difference is applied across the plate of 1 μF capacitor. What is the energy storied in capacitor?

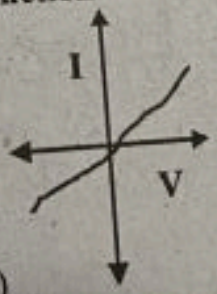
A) 0.5 mJ
B) 5 mJ
C) 0.05 mJ✓
D) 50 mJ

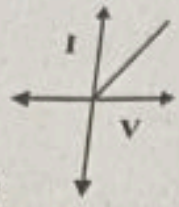
Q.26 Which one of the following is I-V curve of a junction diode?

A)



C)





C)

D)

Q.27 What is the charge stored on a 5 μF capacitor charged to potential difference of 12 V?

A) 60 μC✓ B) 2.4 μC

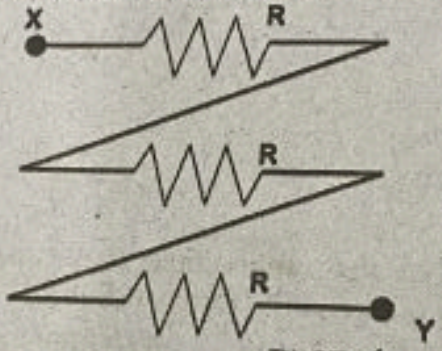
C) 2.4 C D) 60 C

Q.28 12-volt battery is applied across 6-ohm resistance to have a steady flow of current. What must be the required potential difference across the same resistance to have a steady current of one ampere?

A) 12 V B) 1 V

C) 6 V✓ D) 3 V

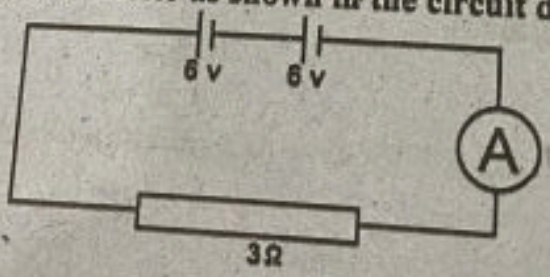
Q.29 Three resistors each having value 'R' are connected as shown in figure. What is the equivalence resistance between 'X' and 'Y'?



A) R B) 3R✓

C) R/3 D) R^3

Q.30 What is the reading of Ammeter as shown in the circuit diagram?



A) 1 A B) 5 A✓

C) 15 A D) 10 A

Magnetism & Electromagnetism

Q.1 The torque acting on a current carrying coil is given by _____.

A) $\tau = NIAB \cos \alpha$✓ B) $\tau = NIAB \sin \alpha$

C) $\tau = BIL \sin \alpha$ D) $\tau = BIL \cos \alpha$

Q.2 **Force on a current carrying conductor in a uniform magnetic field is**
A) $F = NIA \cos \alpha$
B) $F = ILB \sin \alpha$ ✓
C) $F = \mu nI$
D) $F = ILA \cos \alpha$

Q.3 **Force experienced by a moving change in a magnetic field is:**
A) $F = BA \cos\Theta$
B) $F = q (v \times C)$ ✓
C) $F = \mu o\ NI$
D) $F = I (L \times B)$

Q.4 **The value of permeability of free space μo is:**
A) $4\pi \times 10^{-7}\ WbA^{-1}m^{-1}$ ✓
B) $4\pi \times 10^{-7}\ WbA^{-2}m^{-1}$
C) $4\pi \times 10^{2}\ WbA^{-2}m^{-2}$
D) $4\pi \times 10^{2}\ WbA^{-1}m^{-2}$

Q.5 **A charge of two micro coulombs (2μB) moves with velocity of two meter per second (2 m/seB) in the direction of two Tesla magnetic field. The force that will act on it will be:**
A) 2 N
B) 8 N
C) Zero ✓
D) 4 N

Q.6 **We have two coils placed close to each other. When we switch on the battery connected to primary coil while keeping the sliding contact of rheostat at fixed position, the reading of Galvanometer:**
A) First increases and then becomes zero ✓
C) First increases and then becomes constant at some value
B) Increases with the passage of time
D) Remains zero

Q.7 **Power losses in a transformer can be minimized:**
A) By increasing turn ratio
C) By decreasing turn ratio
B) By stopping the flow of Eddy currents ✓
D) Using material of the core whose hysteresis area is large

Q.8 **Frequency of L-C circuit will resonate under the driving action of the antenna by angular value of:**
A) Capacitance ✓
B) Inductance
C) Impedance
D) Resistance

Q.9 **The Lenz's law refers to induced _____**
A) emf.
B) Shear.
C) Resistance.
D) Currents. ✓

Q.10 **Tuning of the radio is the best example of electrical _____**
A) Resonance. ✓
B) Current.
C) Resistance.
D) None of these.

Q.11 **In a step-down transformer the output current _____**
A) Is reduced.
B) Remains same.
C) Is increased. ✓
D) None of these.

Q.12 **The net magnetic field created by the electrons within an atom is due to the field created by their _____ motion.**
A) Orbital.
B) Orbital & spin.

D) Orbital x spin. ✓

C) Spin.

Q.13 If the number of turns of a solenoid circular coil is doubled, but the current in the coil and radius of the coil remains same, then what will be the m gnetic flux density produced by the coil?

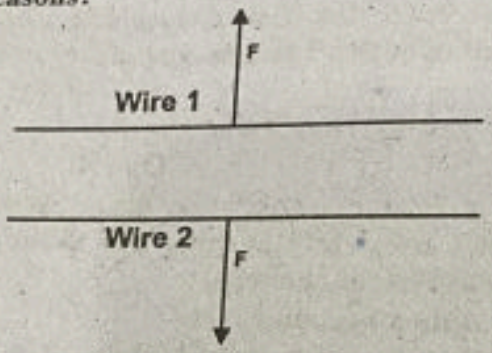
A) Magnetic flux density will be halved

C) Magnetic flux density increases by different amount at different points

B) Magnetic flux density remains unchanged

D) Magnetic flux density will be doubled✓

Q.14 Two long parallel wires Wire 1 and Wire 2 repel each other as shown in the figure. What could be the reasons?



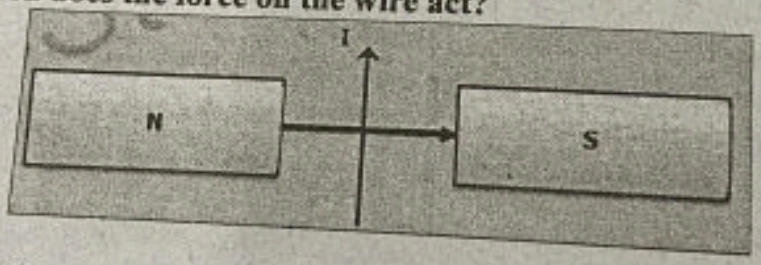
A) Both carry current in same direction

C) Both carry current in opposite direction✓

B) Wire 1 has current, but Wire 2 has no current

D) Wire 2 has current, Wire 1 has no current

Q.15 The diagram shows a wire, carrying a current 'I', placed the poles of a magnet: In which direction does the force on the wire act?



A) Upwards

C) Downwards✓

B) Towards the 'N" pole of the magnet

D) Towards the 'S' pole of the magnet

Q.16 A 10 cm long solenoid has 100 turns. What will be the magnetic field inside it along its axis if one micro ampere current is passed through it?

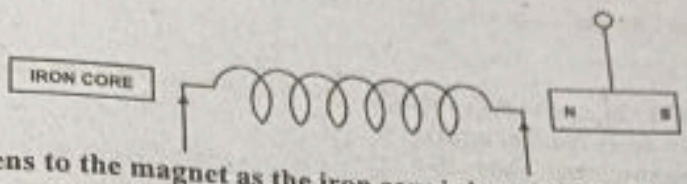
A) $4\pi \times 10^{-13}$ tesla

B) $4\pi \times 10^{-10}$ tesla✓

C) $4\pi \times 10^{-7}$ tesla

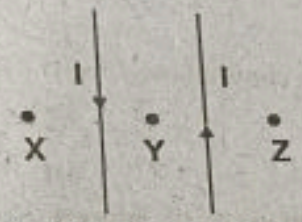
D) $4\pi \times 10^{-16}$ tesla

Q.17 The diagram shows a small magnet hanging on a thread near the end of a solenoid carrying a steady current 'I':



What happens to the magnet as the iron core is inserted into the solenoid?
A) It moves towards solenoid and rotates through 180°
C) It moves towards the solenoid✓
B) It moves away from solenoid
D) It moves away from solenoid and rotates through 180°

Q.18 Two long straight parallel wires held vertically have equal but opposite currents as shown in the figure.

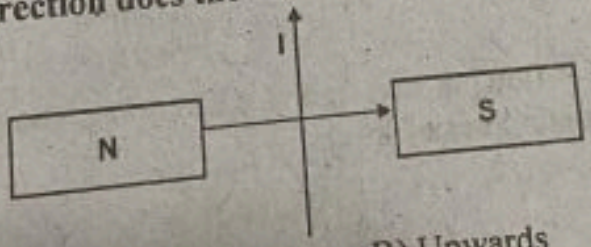


Which of the following effect will be observed?
A) Magnetic field at 'X' is stronger than that at 'Y' and 'Z'✓
C) Magnetic field at 'X' is weaker than that at 'Y' and 'Z'
B) Magnetic field at 'X', 'Y' and 'Z' is same
D) Magnetic field at 'X' is weaker than that at 'Y' but stronger than that at 'Z'.

Q.19 A solenoid is cut into two halves. Magnetic induction due to same current in each half will be:
A) Half of the original
B) Same as original✓
C) Double of the original
D) Four times of the original

Q.20 A long straight current carrying conductor has current directed from bottom to top when held vertically. What will be the direction of magnetic field lines when observed from below the conductor?
A) Clockwise✓
B) Vertically upward
C) Anti clockwise
D) Vertically downward

Q.21 The diagram shows a wire, carrying a current 'I', placed between the poles of magnet: In which direction does the force on the wire act?



A) Towards the 'N' pole of the magnet
B) Upwards
C) Downwards✓
D) Towards the 'S' pole of the magnet

Q.22 A solenoid 15 cm long has 300 turns of wire. A current of 5 A flows through it. What

is the magnitude of magnetic field inside the solenoid?

A) 75×10^{7} T
B) $4\pi \times 10^{-3}$ T ✓
C) $60 \times 10^{+3}$ T
D) $750\pi \times 10^{+3}$ T

Q.23 Due to current in a straight conductor the difference between magnetic field lines

A) Increases away from conductor ✓
C) Decreases away from conductor
B) Increases towards conductor
D) Decreases and then increases towards conductor

Q.24 Magnetic Resonance Imaging (MRI) is used to identify the image of

A) Tumors and inflamed tissues ✓
B) Skin cells
C) Blood cells
D) Bone structures

Q.25 Magnetic field strength is measure in:

A) Wbm^{-1}
B) Wbm^{2}
C) Wbm^{-2} ✓
D) Wb

Q.26 Force on current carrying conductor per unit length is given by:

A) IL sinΘ
C) IL
C) ILB
D) IB sinΘ ✓

Q.27 If 'A' is fundamental dimension of ampere then the dimension of magnetic field strength is:

A) $[MT^{2}A^{-2}]$
B) $[MT^{2}L^{2}A^{-1}]$
C) $[MT^{2}A^{-1}]$ ✓
D) $[MT^{2}L^{-2}A^{-2}]$

Q.28 'F' is maximum force acting on a conductor. Now if we change the direction of conductor by making an angle of 45° with the magnetic field then the force becomes:

A) $\frac{F}{2}$
B) $\frac{F}{\sqrt{2}}$ ✓
C) 2F
D) $\sqrt{2}F$

Q.29 If we doubled all the parameters of the force acting on current carrying conductor and $\theta = 90°$ then magnetic force becomes:

A) Half
B) Eight-times ✓
C) Double
D) Four-times

Q.30 The force acting on current carrying conductor will be maximum if the angle between magnetic field and conductor is:

A) 0°
B) 90° ✓
C) 30°
D) 60°

Q.31 Electric current is flowing through the circuit as shown in figure, what will be the direction of magnetic lines of force:

A) Clockwise✓ B) From top to bottom
C) Anticlockwise D) From bottom to top

Q.32 The magnetic flux linked with a solenoid of area 'A', having 'N' turns at right angle to magnetic field is:
A) NBA✓ B) 1/2NBA
C) BA D) BAcos (theeta)

Q.33 A charge projected with velocity of 10m/s in a magnetic fields of 10T at an angle of 60°, If force exerted on charge is 2.78 × 10 – 17 N, then value of charge is:
A) 1.6×10^{-19} C B) 3.2×10^{-19} C✓
C) 2.7×10^{-19} C D) 4.8×10^{-19} C

Q.34 The value of magnetic flux is 20Wb, when magnetic lines of force containing magnetic field strength of 1T passing through unit area of $10m^2$, then angle between magnetic field and unit area is:
A) 360° B) 90°
C) 180°✓ D) 45°

Q.35 A loop of 5 turns of wire is placed in uniform magnetic field of 0.5T, then area of loop shrinks at a constant rate of 10 m^2/s, the emf induced is:
A) 2.5 V B) 250 V
C) 25V✓ D) 0.25 V

Modern Physics

Q.1 Life time of electron in metastable state is about _____.
A) 10^{-5} sec B) 10^{-8} sec✓
C) 10^{-3} sec D) 10^{-2} sec

Q.2 The minimum frequency below which no electron is emitted from the metal surface is called
A) High frequency B) Threshold frequency✓
C) Low frequency D) Resonance frequency

Q.3 In pair production, the type of photon used
A) α-particle B) X-rays
C) β-particle D) γ-radiations✓

Q.4 The life time of an electron in an excited state is about 10^{-8} s. What is its uncertainty in energy during this time?
A) 1.05×10^{-41} J B) 1.15×10^{10} J
C) 1.05×10^{-26} J✓ D) 2.19×10^{-40} J

Q.5 Velocity of electron moving in first orbit of hydrogen is
A) 2.19×10^{7} m/sec B) 2.2×10^{8} m/sec
C) 2.18×10^{7} m/sec D) 2.19×10^{6} m/sec✓

Q.6 LASER is a potential energy source for inducing which type of reaction?
A) Radioactive B) Ionization
C) Fission D) Fusion✓

Q.7 Einstein's photoelectric equation is given by:
A) $hf = \phi = \frac{1}{2} mv^2$✓ B) $E = hc^2$

C) $E = mc^2$ D) $hf = \frac{1}{2} mv^2$

Q.8 In Compton effect, the value of _____ $m_o c$ is given by:
A) 1.43×10^{-11}m **B) 2.43×10^{-12}m✓**
C) 2.56×10^{-12}m D) 3.46×10^{-6}m

Q.9 **If a particle of mass 5.0 mg moves with the speed of 8.0 m/sec, then the de-Br wavelength will be:**
A) 1.68×10^{-27} m B) 1.65×10^{-29} m
C) 1.70×10^{-25} m **D) 1.66×10^{-29} m✓**

Q.10 **LASER is a device which can produce:**
A) Intense beam of light
C) Intense, Coherent, Monochromatic beam of light✓
B) Coherent beam of light
D) Monochromatic beam of light

Q.11 **A crack allows greater amount of X-rays to pass, which appears on photogr film as:**
A) Blue Area B) Bright Area
C) Dark Area✓ D) Red Area

Q.12 **What is emitted by a hot metal filament in a cathode ray tube?**
A) X-ray. **B) Electron.✓**
C) Proton. D) Photon.

Q.13 **For atomic hydrogen spectrum, which of the following series lies in visible regi electromagnetic spectrum?**
A) Lyman series. **B) Balmer series.✓**
C) Paschen series. D) Bohr series.

Q.14 **For photons of energy greater than 1.02 MeV the probability of pair product occurrence _____ as the energy increases.**
A) Increase.✓ B) Reduces to half.
C) Completely diminishes. D) Remains unchanged.

Q.15 **In photoelectric effect removal of photons is observed at _____ energies.**
A) Low. B) Intermediate.
C) High. **D) Both A and C.✓**

Q.16 **Objects cannot be accelerated to the speed of light in free space is consequence of**
A) Mass variation. B) Inertia forces.
C) Energy-mass relationship. **D) All of these.✓**

Q.17 **In Helium-Neon laser, population inversion of _____ atoms is achieved whi emit radiations, when they are stimulated to fall at lower level.**
A) Neon✓ B) Helium and Neon
C) Helium D) Chromium

Q.18 **Wavelength of X-rays is the order of:**
A) 10^{-6} m B) 10^{-13} m
C) 10^{-10} m✓ D) 100 m

Q.19 **Laser beam can be used to generate three-dimensional image of object in a proces called:**
A) Computed technology **B) Holography✓**
C) Computed tomography D) Computerized axial tomography

Q.20 **Which of the following is true for Lasers?**
A) Electrons are emitted
C) Stimulated emission of electrons is needed

B) Coherent monochromatic light is emitted
D) There is a population inversion of photons✓

What is meant by spontaneous emission of electrons in solids?
A) Electrons being emitted by the solids through photoelectric effect when irradiated with electromagnetic radiation
C) Incident electrons colliding with electrons in solids and releasing doubling the number of incident electrons
B) Electrons in solids are emitted without any external stimulus through radiation
D) Excited electrons going back to lower energy states immediately by releasing energy. ✓

When electrons lose all their kinetic energy in the first collision, the entire kinetic appears as an X-ray photon of energy:
A) K.E = eV✓
B) $K.E = \frac{hc}{\lambda_{min}}$
C) $K.E = \frac{\lambda_{min}}{hc}$
D) $K.E = \frac{hc}{\lambda_{max}}$

The characteristic X-ray spectrum is due to:
A) The absorption of neutrons by target material
C) The bombardment of target material by protons
B) The bombardment of target material by electrons✓
D) The bombardment of target material by alpha particles

The kinetic energy K.E. with which the electron strikes the target is given by:
A) $K.E. = e^2V$
B) $K.E. = hf^2$
C) $K.E. = hc/\lambda$
D) K.E. = eV✓

LASER is an acronym for:
A) Light amplification by stimulated emission of radiation✓
C) Light annihilation by stimulated emission of radiation
B) Light amplitude of stimulated emission of radiation
D) Light amplification by stimulated emission of radio

X-rays can be produced by bombardment of _____ on target metal:
A) Protons
B) Neutrons
C) Electrons✓
D) Alpha particles

Laser light is monochromatic which means
A) It consists of one ray of light
C) It consists of one wavelength✓
B) It consists of carbon monoxide gas
D) It consists of photons having 1 eV energy

If an electron in the 'K' shell is removed and an electron from 'L' shell jumps to occupy the hole in the 'K' shell, it emits a photon of energy:
A) $hf_{K\alpha} = E_L - EK$✓
B) $h/\lambda_{K\alpha} = E_L - E_K$
C) $hc = E_L - EK$
D) $hf_{K\alpha} = E_K - E_L$

Which of the following property must be there in a substance so that it can be used as target in X-ray tube?
A) It must have low melting point
B) It must have high reflecting ability
C) It must have low atomic number
D) It must have high atomic number✓

Which of the following can be used to produce population inversion for the emission

of Laser?
A) Optical pumping✓
B) Optical instrument
C) Optical fibre
D) Optical polarization

Nuclear Physics

Q.1 In the half-life of an element, the equation for the number of decaying atoms is g by
A) $\Delta \propto -N\Delta t$✓
B) $\Delta N \propto -n\Delta t$
C) $\Delta N = KN\Delta t$
D) $\Delta N = -\Delta N\Delta t$

Q.2 Decay constant 'λ' is given as
A) $-\frac{\Delta N/N}{\Delta t}$✓
B) $-\frac{N}{\Delta t}$
C) $-\frac{\Delta N}{\Delta t}$
D) $-\frac{\Delta N/N}{\Delta t}$

Q.3 The SI unit of absorbed dose 'D' i.e. radiation effect is Gray and one Gray is equal t
A) kJ / mol
B) kg / J
C) J / mol
D) J / kg✓

Q.4 The emission of γ-radiations from the nucleus is generally represented by th equation:
A) ${}^{A}_{Z}X \rightarrow {}^{A}_{Z}X^{*} + \gamma$-radiations
B) ${}^{A}_{Z}X^{*} \rightarrow {}^{A}_{Z-1}X + \gamma$-radiations
C) ${}^{A}_{Z}X^{*} \rightarrow {}^{A}_{Z}X + \beta$-particles
D) ${}^{A}_{Z}X^{*} \rightarrow {}^{A}_{Z}X + \gamma$-radiations✓

Q.5 For intermediate energy of radiations, the dormant process is:
A) Compton Effect✓
B) Photoelectric Effect
C) Nuclear Effect
D) Pair Production

Q.6 Ultraviolent radiations cause:
A) Severe Crop Damage
B) Decay of Microorganisms
C) Sunburn, blindness, skin cancer
D) All of the above✓

Q.7 When a helium atom loses an electron, it becomes:
A) An alpha particle
B) A positive helium ion.✓
C) Proton.
D) A negative helium ion.

Q.8 Beta ray emitted by a radioactive substance is:
A) An electron which was existing outside the nucleus.
C) An electron which was existing inside the nucleus.✓
B) An electron emitted by the nucleus as a result of the decay of neutron inside the nucleus.
D) A pulse of electromagnetic wave.

Q.9 Which one is most stable element on the basis of binding energy?
A) Sn.
B) Kr.
C) Ba.
D) Fe.✓

Q.10 _____ are the particles that experience strong nuclear force.
A) Electrons.
B) Neutrinos.

C) Muons. D) Neutrons.✓

The neutron is assumed to be made of
A) One up quark and two down quarks.✓
B) Two up quarks and one down quark.
C) Two up quarks and two down quarks.
D) One up quark and one down quark.

The cobalt is absorbed by
A) Bones. **B) Liver.✓**
C) Skin. D) Thyroid gland.

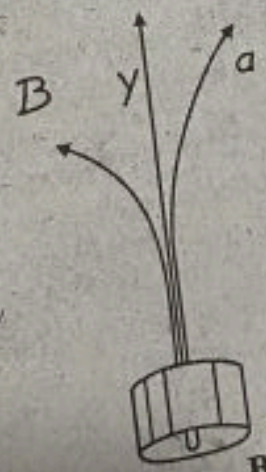
Ionizing capability of gamma rays is:
A) Equal to alpha and beta particle
C) Less than alpha but greater than beta particles
B) Less than both alpha and beta particles✓
D) Less than beta but greater than alpha particles

Half-life of a radioactive element is:
A) Inversely proportional to square of decay constant
C) Directly proportional to square of decay constant
B) Directly proportional to decay constant
D) Inversely proportional to decay constant✓

The transformation of a neutron into proton in the nucleus gives rise to emission of:
A) Beta particles✓ B) Gamma particles
C) Alpha particles D) X-rays

The ratio of the rate of decay of a parent atom to the number of radioactive nuclei present at that time is equal to:
A) Half-life of radioactive element
C) Mean life
B) Decay constant of radioactive element✓
D) Activity if radioactive element

In a radioactive phenomenon observation shown in figure where α deviates lesser than β in some electric or magnetic field (not shown in figure). What is the reason of less deviation of α?



A) α is charged particle **B) α is heavier particles✓**
C) α is neutral particle D) α is lighter particle

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D Chemistry

108 MCQs

Fundamental Concepts

Q.1 When one mole of gaseous hydrogen ions are dissolved in water to form an infinite dilute solution, the amount of heat liberated is
A) -1891 $kJmol^{-1}$
B) -1075 $kJmol^{-1}$ ✓
C) -499 $kJmol^{-1}$
D) -1562 $kJmol^{-1}$

Q.2 One mole of any gas at standard temperature and pressure (STP) occupies a volume of
A) 20.414 dm^3
B) 22.414 dm^3 ✓
C) 22.414 cm^3
D) 23.414 dm^3

Q.3 The relative abundance of the isotopes of the elements can be determined by:
A) Mass Spectrometry ✓
B) X-rays
C) Chromatography
D) Solvent Extraction

Q.4 The root mean square velocity of gases is inversely proportional to the square root of their:
A) Molar mass ✓
B) Temperature
C) Pressure
D) Volume

Q.5 The acid which can be purified by the sublimation is:
A) Acetic Acid
B) Benzoic Acid ✓
C) Oxalic Acid
D) Citric Acid

Q.6 Paper chromatography is used for:
A) Elemental Analysis
B) Industrial Purification
C) Qualitative Analysis ✓
D) Structural Analysis

Q.7 The process of filtration is used to separate _____ particles from liquids.
A) Radial.
B) Angular.
C) Insoluble. ✓
D) Soluble.

Q.8 London forces are very significant in _____
A) Sulphur.
B) Phosphorous.
C) Argon. ✓
D) Sugar.

Q.9 Ten moles of hydrogen are allowed to react with 6 moles of oxygen. How much water will be obtained from reaction on complete consumption of one gas?
A) 10 moles. ✓
B) 8 moles.
C) 6 moles.
D) 4 moles.

Q.10 In mass spectrometer, detector or collector measures the:
A) Masses of isotopes
B) Percentages of isotopes
C) Relative abundances of isotopes ✓
D) Mass numbers of isotopes

Q.11 How many 'Cl' (chlorine) atoms are in two moles of chlorine?
A) $2 \times 6.02 \times 10^{-23}$ atoms
B) $35.5 \times 6.02 \times 10^{23}$ atoms
C) 2×10^{23} atoms
D) $2 \times 6.02 \times 10^{23}$ atoms ✓

Q.12 An organic compound has empirical formula C_3H_3O, if molar mass of compound is 110.15 $gmol^{-1}$. The molecular formula of this organic compound is (A, of C=12, H=1.008 and O=16)
A) $C_6H_6O_2$ ✓
C) C_3H_3O
C) $C_9H_9O_3$
D) $C_6H_6O_3$

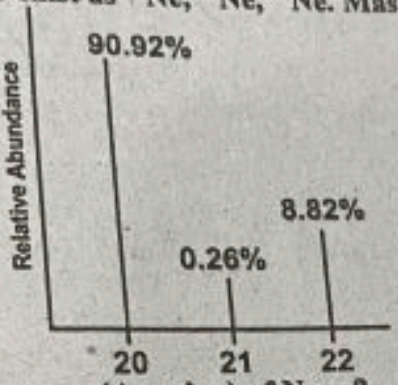
When 8 grams (4 moles) of H_2 react with 2 moles of O_2, how many moles of water will be formed?
A) Five
B) Four✓
C) Six
D) Three

Hydrogen burns in chlorine to produce hydrogen chloride. The ratio of masses of reactants in chemical reaction is:

$$H_2 + Cl_2 \longrightarrow 2HCl$$

A) 1:35.5✓
B) 2:35.5
C) 1:71
D) 2:70

A sample of Neon is found to exist as ^{20}Ne, ^{21}Ne, ^{22}Ne. Mass spectrum of 'Ne' is as follow:



What is the relative atomic mass (A, value) of Neon?
A) 20.18 B) 20.10 C) 20.28✓ D) 20.22

A polymer of empirical formula CH2 has molar mass of 28000 g mol^{-1}. Its molecular formula will be
A) 100 times that of its empirical formula
B) 200 times that of its empirical formula
C) 500 times that of its empirical formula
D) 2000 times that of its empirical formula✓

The number of molecules in 9 g of ice (H_2O) is
A) 6.02×10^{24}
B) 6.02×10^{23}
C) 3.01×10^{24}
D) 3.01×10^{23}✓

How many moles of sodium are present in 0.1 g of sodium?
A) 4.3×10^{-3}✓
B) 4.03×10^{-1}
C) 4.01×10^{-2}
D) 4.3×10^{-2}

With the help of spectral data given calculate the mass of Neon and encircle the best option. (Percentage of $10Ne^{20}$, $10Ne^{21}$ and $10Ne^{22}$ are 90.92%, 0.26% and 8.82% respectively).
A) 22.18 amu
B) 21.18 amu
C) 20.18 amu✓
D) 22.20 amu

The substance for the separation of isotopes is firstly converted into the:
A) Neutral state B) Vapour state✓ C) Free state D) Charged state

The number of moles of CO2 which contain 8.00 gm of oxygen is:
A) 0.75 B) 0.25✓ C) 1.50 D) 1.00

There are almost 200 million people alive in Pakistan. If you were to distribe Rupee 100 to each Pakistani in the form of 5 Rupee coin, how many moles of coins you must have:
A) 6.67×10^{-14}
B) 1.15×10^{-14}
C) 6.67 x 1014
D) 1.5×10^{14}

States of Matter

Q.1 Collagen and albumin are
A) Simple proteins✓ C) Polyamides
B) Derived proteins D) Polysaccharides

Q.2 If we are given the mass of one substance, we can calculate volume of other substa and vice a versa with the help of balanced chemical equation. This is called
A) Mass-mass relationship C) Mole-volume relationship
B) Mass-mole relationship D) Mass-volume relationship✓

Q.3 In the process of respiration there is application of:
A) Dalton's Law✓ C) Boyle's Law
C) Charles's Law D) Graham's Law

Q.4 _____% of the known universe is in the plasma state.
A) 30 C) 50
B) 99✓ D) 80

Q.5 100 m^3 of a gas at 3 atm pressure and 27 °C is transferred to a chamber of 300 m^3 volume maintained at a temperature of 327 °C. What will be the pressure in chamber?
A) 6 atm. C) 2 atm.✓
B) 4 atm. D) 1 atm.

Q.6 Melting point of water is higher than petrol, because intermolecular forces in water are:
A) Weaker than petrol C) Same as in petrol
B) Stronger than petrol✓ D) Negligible

Q.7 DNA molecule is double stranded, in which two chains of DNA are twisted around each other by:
A) Hydrogen bonds✓ C) Covalent bonds
B) Vander Waal's force D) Dative bonds

Q.8 The number of molecules in 22.4 dm^3 of H2 gas at 0 °C and 1 atm are
A) 60.2×10^{23} C) 6.02×10^{25}
B) 6.02×10^{22} D) 6.02×10^{22}✓

Q.9 Correct order of boiling points of the given liquid is
A) $H_2O > HF > HCl > NH_3$ C) $H_2O > HF > NH_3 > HCl$✓
B) $HF > H_2O > HCl > NH_3$ D) $HF > H_2O > NH_3 > HCl$

Q.10 The coordination number of Na^+ in NaCl crystal is:
A) 6✓ C) 4
B) 2 D) 8

Q.11 There are four gases H_2, He, N_2 and CO_2 at 0 °C. Which gas shows greater non-ideal behavior?
A) He C) H_2
B) CO_2✓ D) N_2

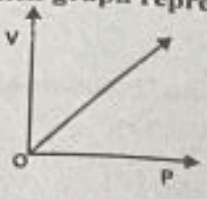
Q.12 Ice is less dense than water at:
A) 0 °C✓ C) -4 °C
B) 4 °C D) 2 °C

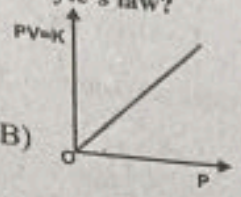
Q.13 At a given temperature and pressure, the one which shows marked deviation from ideal behavior is
A) N_2 C) CO_2✓
B) N_3 D) He

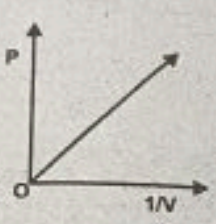
Q.14 If the volume of a gas collected at a temperature of 600 °C and pressure of 1.05×10^5 Nm

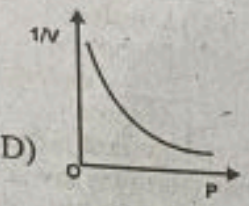
^{2} is 60 dm^3, what would be the volume of gas at STP ($P=1.01 \times 10^5\ Nm^{-2}$, $T = 273$ K)?
A) 25 cm^3
B) 75 cm^3
C) 100 cm^3
D) 51 cm^3 ✓

Q.15 Which graph represents Boyle's law?

A)


B)


C)


D)


Answer : B

Q.16 **London dispersion forces are the only forces present among the:**
A) Molecules of H_2O in liquid state
B) Molecules of HCl gas
C) Atoms of helium in gaseous state at high temperature ✓
D) Molecules of solid chlorine

Atomic Structure

Q.1 **In an electrochemical series, standard electrode potentials are arranged on the basis of:**
A) pH scale
B) pOH scale
C) Hydrogen Scale ✓
D) pK_a scale

Q.2 **Urea is produced by the reaction of liquid ammonia with**
A) CO_2 ✓
B) CO
C) CaO
D) C

Q.3 **Which one of the following mathematical expressions represents the Avogadro's law?**

A) $V = R\frac{nT}{P}$ (when 'T' and 'n' are constant)

B) $V = R\frac{nT}{P}$ (when 'P', 'T' and 'n' are constant)

C) $V = R\frac{P}{nT}$ (when 'P' and 'n' are constant

D) $V = R\frac{nT}{P}$ (when 'P' and 'T' are constant) ✓

Q.4 **The charge of one gram of electron is**
A) 1.7588×10^{-11}
B) 1.7588×10^{11}
C) 1.602×10^{-19}
D) 1.7588×10^{8} ✓

Q.5 **Which quantum number helps to study the orientation of an orbital in space?**

A) Principal Quantum Number
B) Spin Quantum Number
C) Magnetic Quantum Number✓
D) Azimuthal Quantum Number

6 Metallic conduction involves the relatively free movement of their _____ throughout the metallic lattice
A) Atoms
B) Molecules
C) Electrons✓
D) Ions

.7 During isotopic analysis, the pressure of the vapours of the ions maintained in the ionization chamber of mass spectrometer is:
A) Around 10^{-7} torr✓
B) Around 10^{-3} torr
C) 1 torr
D) 10^{-7} torr

.8 Electron gas theory was proposed to explain the bonding in _____ solids:
A) Molecular
B) Ionic
C) Covalent
D) Metallic✓

.9 The electron present in a particular orbit _____ energy.
A) Releases.
B) Does not radiate.✓
C) Absorbs.
D) None of these.

.10 The elements for which the value of ionization energy is low, can:
A) Gain electrons readily
B) Gains electron with difficulty
C) Loss electrons less readily
D) Lose electrons readily✓

.11 The nature of cathode rays in discharge tube:
A) Depends on the nature of gas taken in the discharge tube
B) Depends upon the nature of cathode in discharge tube
C) Is independent of the nature pf the gas in discharge tube✓
D) Depends upon the nature of anode in the discharge tube

Q.12 The relative energies of 4s, 4p and 3d orbitals are in the order
A) 3d < 4p <4s
B) 4s < 3d < 4p✓
C) 4p < 4s < 3d
D) 4p < 3d < 4s

Q.13 With increase in the value of Principal Quantum Number 'n', the shape of the s-orbitals remains the same although their sizes
A) Decrease
B) Increase✓
C) Remain the same
D) May or may not remain the same

Q.14 Correct order of energy in the given subshells is:
A) 5s > 3d > 3p > 4s
B) 5s > 3d > 4s > 3p✓
C) 3p > 3d > 5s > 4s
D) 3p > 3d > 4s > 5s

Q.15 Number of electrons in the outermost shell of chloride ion (Cl^-) is:
A) 17
B) 3
C) 1
D) 8✓

Q.16 According to the number of protons, neutrons and electrons given in the table, which one of the following options is correct?

Species	Proton	Neutron	Electron
As	33	42	30
Ga	31	39	28
Ca	20	20	20

A) As^{-3}, Ga^{+3}, Ca
B) As^{+1}, Ga^{+2}, Ca
C) As^{+3}, Ga^{+3}, Ca^{+2}✓
D) As^{+1}, Ga, Ca^{+2}

Q.17 If the e/m value of electron is 1.7588×10^{11} coulombs Kg^{-1}, then what would be the mass of electron in grams (charge on electron is 1.6022×10^{-19} coulombs)?

A) 9.1095×10^{-31} g✓
B) 91.095×10^{-31} g
C) 9.1095×10^{-28} g
D) 0.919095×10^{-33} g

Q.18 Which one of the following pairs has the same electronic configuration as possessed by Neon (Ne-10)?
A) Na^+, Cl^-
B) K^+, Cl^-
C) Na^+, Mg^{2+}
D) Na^+, F^-✓

Q.19 There are four orbitals s, p, d and f. Which order is correct with respect to the increasing energy of the orbitals?
A) 4s < 4p < 4d < 4f✓
B) 4p < 4s < 4f < 4d
C) 4s < 4f < 4p < 4d
D) 4f < 4s < 4d < 4p

Q.20 Number of neutrons in $^{66}_{30}Zn$ will be:
A) 30
B) 35
C) 38
D) 36✓

Chemical Bonding

Q.1 Energy required to remove an electron from the outermost shell of its isolated gaseous atom in the ground state is
A) Electron affinity
B) Lattice energy
C) Ionization energy✓
D) Crystal energy

Q.2 Paramagnetic behavior of an atom, ion or molecule is due to presence of
A) Unpaired electrons✓
B) Paired electrons
C) Protons
D) Neutrons

Q.3 In the structure of NaCl, each Na^+ is surrounded by _____ Cl^- ions.
A) Four
B) Eight
C) Five
D) Six✓

Q.4 The ionization energy of hydrogen atom is
A) Zero
B) 13.13 $kJmol^{-1}$
C) 1313.31 $kJmol^{-1}$✓
D) 1313.31 k^2Jmol

Q.5 The inter-ionic distance in a crystal lattice of KCl is
A) 314 pm✓
B) 181 pm
C) 95 pm
D) 300 pm

Q.6 The number of bonds in nitrogen molecule is
A) One σ and two π✓
C) One σ and one π
C) Three σ only
D) Two σ and one π

Q.7 The extent of bonding of a light ray after passing through prism depends upon:
A) Wavelength of photons✓
B) Wave number of photons
C) Energy of photons
D) Frequency of photons

Q.8 Splitting of spectral lines in closely spaced lines in presence of magnetic field is called:
A) Stark Effect
B) Zeeman Effect✓
C) Photoelectric Effect
D) Compton Effect

Q.9 A bond is not formed:
A) When both forces become equal to each other
B) When repulsive forces become equal to zero
C) When attraction forces dominate repulsive forces
D) When repulsive forces dominate attraction forces✓

Q.10 If the electronegativity difference between bonded atoms is zero, the bond between the

two atoms is:
A) Polar
B) Partially Ionic
C) Non-polar✓
D) Both B and C

Q.12 In crystal lattice of ice, each O-atom of water molecule is attached to:
A) Four H-atoms✓
B) Three H-atoms
C) One H-atom
D) Two H-atoms

Q.13 The suitable representation of dot structure of chlorine molecule is:

A) :Cl: :Cl:
B) :Cl : Cl:
C) Cl || Cl
D) Cl : Cl

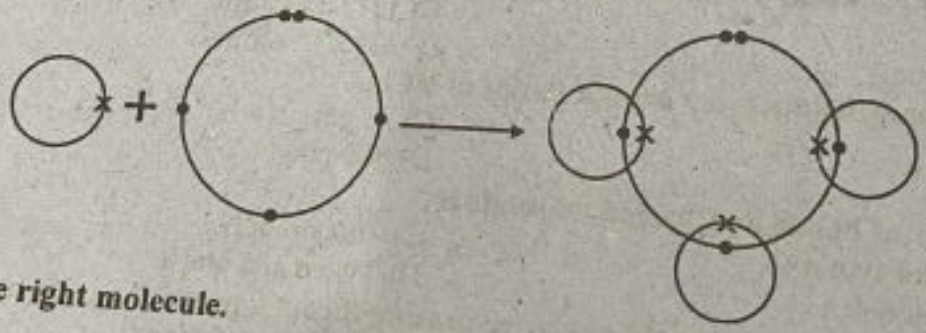
Q.14 When the two partially filled atomic orbitals overlap in such a way that the probability of finding electron is maximum around the line joining the two nuclei, the result is the formation of
A) Sigma Bond✓
B) Pi-Bond
C) Hydrogen Bond
D) Metallic Bond

Q.15 Which one of the following hydrogen bonds is stronger than others?
A) $N^{\delta-}—H^{\delta+}$ ..... $N^{\delta-}—H^{\delta+}$
B) $F^{\delta-}—H^{\delta+}$ ..... $F^{\delta-}—H^{\delta+}$✓
C) $O^{\delta-}—H^{\delta+}$ ..... $O^{\delta-}—H^{\delta+}$
D) $N^{\delta-}—H^{\delta+}$ ..... $O^{\delta-}—H^{\delta+}$

Q.16 Which of the following is the correct dot and cross diagram of bonding between two chlorine atoms?

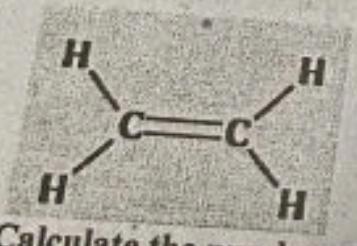
A) :Cl + :Cl: ⟶ :Cl:
B) :Cl + Cl: ⟶ :Cl + :Cl:
C) :Cl + :Cl ⟶ :Cl:Cl:
D) :Cl + Cl ⟶ :Cl: + Cl

Q.17



Choose the right molecule.
A) CH3
B) CO
C) H2O
D) NH3✓

Q.18



Calculate the number of σ bonds and π bonds in the molecule.
A) 1π and 5σ bonds✓
B) 2π and 4σ bonds
C) 3π and 3σ bonds
D) 6π and 6σ bonds

Q.19 What is the exact value of angle in BF_3:
A) 90°
B) 119.5°
C) 104.5°
D) 120°✓

Q.20 Which option shows all the molecules with bond angle 109.5°:
A) CH_4, CCl_4, NH_3
B) CH_4, NH_4 PH_3
C) $SiCl_4$ H_2O $BeCl_2$
D) $SiCl_4$ NH_4CH_4✓

Chemical Energetics

Q.1 Which one of the following molecules has zero dipole moment?
A) NH_3
B) $CHCl_3$
C) BF_3✓
D) H_2O

Q.2 A spontaneous process is
A) Unidirectional and irreversible
B) Irreversible and a real process
C) Unidirectional and a real process
D) All of the above✓

Q.3 Which of the following is an exothermic reaction?
A) $H^+_{(aq)} + OH^-_{(aq)} \rightarrow H_2O_{(l)}$ ✓
B) $Na_{(g)} \rightarrow Na^+_{(g)} + 1e^-$
C) $\frac{1}{2}H_{2(g)} \rightarrow H_{(g)}$
D) $\frac{1}{2}Cl_{2(g)} \rightarrow Cl_{(g)}$

Q.4 Which of the following formation is an endothermic reaction?
A) $C_{(g)} + O_{2(g)} \longrightarrow CO_2$
B) $N_{2(g)} + 3H_{2(g)} \longrightarrow 2NH_{3(g)}$
C) $2H_2O_{(l)} \longrightarrow 2H_{2(g)} + O_{2(g)}$ ✓
D) None of the above

Q.5 The heat of hydration decreases with the increase in:
A) Number of neutrons
B) Size of cations✓
C) Size of atomic radii
D) Number of electrons

Q.6 Which of the following formation is endothermic reaction?
A) $2H_2(g) + O_2(g) \longrightarrow 2H_2O(l)$.
B) $C(s) + O_2(g) \longrightarrow CO_2(g)$.
C) $N_2(g) + O_2(g) \longrightarrow N_2O_2(g)$.✓
D) None of these.

Q.7 Which of the following bonds has minimum bond energy?
A) C – F.
B) C – Cl.
C) C – I.✓
D) C – Br.

Q.8 The amount of heat absorbed by one mole of solid at 1 atm when it melts into liquid form is denoted by _____
A) Δ Hv.
B) Δ Hf.✓
C) Δ Hi.
D) Δ Hs.

Q.9 Lattice energy of an ionic crystal is the enthalpy of:
A) Combustion
B) Dissociation
C) Dissolution
D) Formation✓

Q.10 In standard enthalpy of atomization, heat of the surrounding:
A) Remains unchanged
B) Increases
C) Increases than decreases
D) Decreases✓

Solutions

Q.1 Which type of force is present in gasoline?
A) Dipole-dipole forces
B) Dipole-induced dipole forces
C) London dispersion forces✓
D) hydrogen bonding

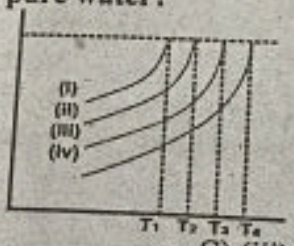
Q.2 The standard enthalpy of solution of NH4Cl is _____ $kJmol^{-1}$.
A) +16.2✓
B) -25.0
C) +4.98
D) +26.0

Q.3 0.1 mole of acetic acid has been dissolved per dm^3 of the solution, the percentage ionization of acetic acid will be
A) 13
B) 15
C) 1.3✓
D) 0.1

Q.4 Solubility of $Ce_2(SO_4)_3$
A) Increases with temperature
B) Decreases with temperature
C) Shows exceptional behavior✓
D) Remains constant

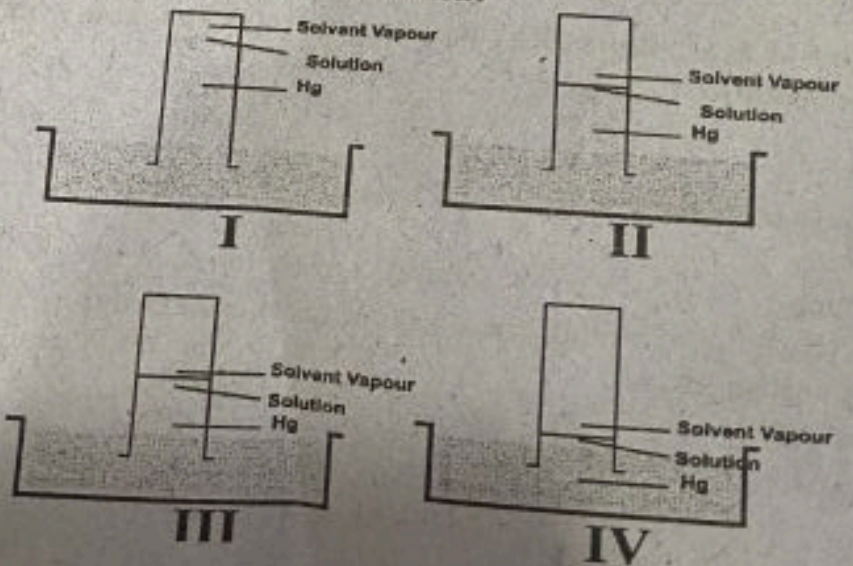
Q.5 Solubility of $KClO_3$ can be decreased bin H_2O by:
A) Removing K^+ ions from the solution
B) Removing $ClO3^{-1}$ ions from the solution
C) Adding KCl from outside✓
D) Adding NaNO3 from outside

Q.6 The vapor pressure lines for pure as well as solutions of different concentrations are shown. Which line represents pure water?



A) (i) ✓
B) (ii)
C) (iii)
D) (iv)

Q.7 One mole of glucose was dissolved in 1 kg of water, ethanol, ether and benzene separately and the molal boiling point constant of each individual solution was found to be 0.52, 1.75, 2.16 and 2.70 in the units of / °C kg mol^{-1} respectively. Which of the following figures shows benzene as solvent in solution?



A) I✓
B) II
C) III
D) IV

Q.8 10.0 grams of glucose are dissolved in water to make 100 cm^3 of its solution, its molar is:
A) 0.55✓
B) 0.1
C) 10
D) 1

Q.9 Given solution contains 16.0 g of CH_3OH, 92.0 g of C_2H_5OH and 36 g of water. Whi statement about mole fraction of the components is true?
A) Mole fraction of CH_3OH is highest among all
B) Mole fraction of C_2H_5OH and H_2O is the same✓
C) Mole fraction of CH_3OH and C_2H_5OH is same components
D) Mole fraction of H2O is the lowest among all

Q.10 Freezing point will also be defined as that temperature at which its solid and liqu phases have the same:
A) Concentration
B) Ratio between the particles
C) Vapour pressure✓
D) Attraction between the phases

Electrochemistry

Q.1 Which of the following compounds, in the form of aqueous solution, on reaction wi sodium carbonate will produce carbon dioxide gas?
A) H_3C-COO-C_2H_5
B) H_3C_2-COO-CH_3
C) $H3C_2$-CO-OH✓
D) H_3C_2-COO-C_2H_5

Q.2 Plasma is the ionized gas mixture which consists of
A) Ions and electrons
B) Electrons and neutral atoms
C) Electrons, ions and neutral atoms✓
D) Ions and neutral atoms

Q.3 In conjugated protein molecules, the protein is attached or conjugated to some non protein group which are called:
A) Prosthetic Group✓
B) Aldehyde Group
C) Hydrogen Bonding
D) Peptide Linkage

Q.4 Stronger the oxidizing agent, greater is the:
A) Redox Potential
B) emf of the cell
C) Oxidation Potential
D) Reduction Potential✓

Q.5 The emf produced by Galvanic Cell is known as:
A) Redox Potential
B) Oxidation Potential
C) Cell Potential✓
D) None of the above

Q.6 In nickel-cadmium battery, the cathode is composed of:
A) Cd
B) $Ni(OH)_2$
C) Ni
D) NiO_2✓

Q.7 Concentrated sugar solution undergoes hydrolysis into glucose and fructose by enzyme called:
A) Zymase
B) Invertase✓
C) Cellulose
D) Urease

Q.8 The most durable metal plating on iron to protect against corrosion is:
A) Tin plating
B) Zinc plating✓
C) Nickel plating
D) Copper plating

Q.9 When cuSO4 is electrolyzed in aqueous solution using copper electrodes, then the ubstance which deposits at the cathode is:
A) Copper metal✓
B) Copper ions
C) Hydrogen
D) Oxygen

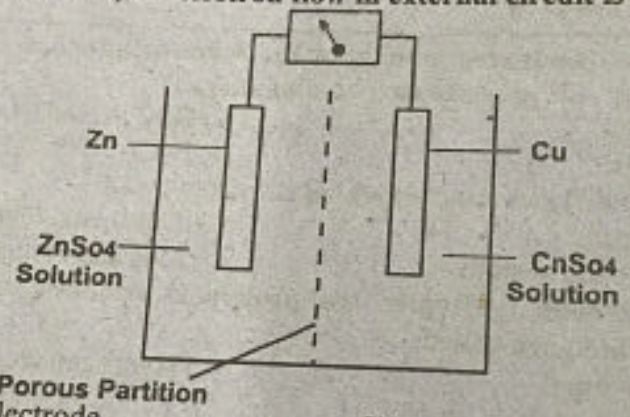
Q.10 In electrolytic cell, a salt bridge is used in order to:
A) Pass the electric current
B) Prevent the flow of ions
C) Mix solution of two half cells
D) Allow movement of ions b/w two half cells✓

Q.11 In all oxidation reactions, atoms of an element in a chemical species lose electrons and increase their:
A) Oxidation states✓
B) Reductions
C) Electrode
D) Negative charges

Q.12 In electrolysis of aqueous $CuCl_2$, the metal deposited at cathode is
A) Sodium
B) Aluminium
C) Lead
D) Copper✓

Q.13 In MgCl2, the oxidation state of 'Cl' is
A) Zero
B) +2
C) -2
D) -1✓

Q.14 In the figure given below, the electron flow in external circuit is from:



A) Copper to zinc electrode
B) Right to left
C) Porous partition to zinc electrode
D) Zinc to copper electrode✓

Q.15 Which one of the following is a redox reaction?
A) $NaCl + AgNO_3 \longrightarrow NaNO_3 + AgCl_2$
B) $2Cl^- \longrightarrow Cl_2 + 2e^-$
C) $2Na + Cl_2 \longrightarrow 2NaCl$✓
D) $Na^+ + 1e^- \longrightarrow Na$

Q.16 In $SO4^{-2}$ the oxidation number of Sulphur is
A) -8
B) +8
C) -6
D) +6✓

Q.17 Coinage metals Cu, Ag, and Au are the least reactive because they have:
A) Negative reduction potential
B) Positive reduction potential✓
C) Negative oxidation potential
D) Positive oxidation potential

Chemical Equilibrium

Q.1 Equilibrium constant Kc for $H_2O \longrightarrow H^+ + OH^-$ Can be written as follows:

A) $K_c = \frac{[H^+]}{[H_2][OH^-]}$

B) $K_c = \frac{[OH^-]}{[H^+][OH^-]}$

C) $K_c = \frac{[OH^-][H^+]}{[H_2O]}$ ✓

D) $K_c = \frac{[H_2O]}{[H^+][OH^-]}$

Q.2 _____ is used as catalyst in Haber's process for NH3 gas manufacture.

A) Iron.✓

B) Carbon.

C) Copper.

D) Silver.

Q.3 In 'AgCl' solution. Some salt of NaCl is added, 'AgCl' will be precipitated due to:

A) Solubility

B) Electrolyte

C) Unsaturation effect

D) Common ion effect✓

Q.4 'Ka' for an acid is higher, the stronger is the acid; relate the strength an acid with 'pKa'

A) Higher pKa, weaker the acid

C) pKa has no relation with acid strength

B) Lower pKa, stronger the acid

D) Both A and B✓

Q.5 Formation of NH_3 is reversible and exothermic process, what will happen on cooling?

A) More reactant will form

B) More N_2 will be formed

C) More H_2 will be formed

D) More product (NH_3) will be formed✓

Q.6 A buffer solution is that which resists/minimizes the change in

A) pOH

B) pH✓

C) pKa

D) pKb

Q.7 The chemical substance, when dissolved in water, gives "H^+" is called:

A) Acid✓

B) Base

C) Amphoteric

D) Neutral

Q.8 The 'pH' of our blood is:

A) 6.7 – 8

B) 7.9

C) 7.5

D) 7.35 – 7.4✓

Q.9 The value of equilibrium constant (Kc) for the reaction $2HF_{(s)} \rightleftharpoons H_{2(g)} + F2(g)$ is 10^{-13} at 2000 °C. Calculate the value of Kp for this reaction:

A) 2×10^{-13}

B) 10^{-13}✓

C) 186×10^{-13}

D) 3.48×10^{-9}

Q.10 What will be the pH of a solution of NaOH with a concentration of 10^{-3} M?

A) 3

B) 14

C) 11✓

D) 7

Reaction Kinetics

Q.1 The reaction which is responsible for the production of electricity in the Voltaic cell is:
A) Hydrolysis reaction
B) Oxidation reaction
C) Redox reaction✓
D) Reduction reaction

Q.2 The rate of reaction involving ions can be studied by _____ method
A) Dilatometric
B) Refractometric
C) Optical rotation
D) Electrical conductivity✓

Q.3 The Kc has following units for the reaction $H_2(g) + I_{2(g)} \rightleftharpoons 2HI_{(g)}$
A) mol^3dm_3
3B) $moldm^3$
C) mol^3dm
D) No unit✓

Q.4 The rate equation determined experimentally for this reaction:

$$(CH3)3—C—Br + H2O \quad (CH3)3—C—OH + HBr$$

Is, Rate = k[(CH3)3CBr]
Hence it is which of the follwing?
A) Fractional Order
B) Pseudo First Order✓
C) First Order
D) Second Order

Q.5 A limiting reactant is the one which:
A) Is mostly a cheaper substance and taken in larger quantity
B) Is consumed earlier and controls the amount of product formed in a chemical reaction✓
C) Gives greatest number of moles of products
D) Is left behind after the completion of reaction

Q.6 _____ is colorless volatile liquid at room temperature.
A) HCl. B) HI. **C) HF.✓** D) HBr.

Q.7 It is experimentally found that a catalyst is used to:
A) Lower the activation energy✓
B) Increase the activation energy
C) Lower the pH
D) Decrease the temp of the reaction

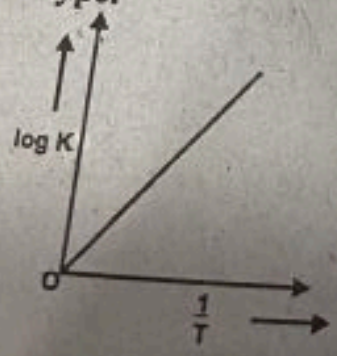
Q.8 According to collision theory of bimolecular reaction sin gas phase, the minimum amount of energy required for an effective collision is known as:
A) Heat of reaction
B) Rate of reaction
C) Has no effect on the reaction
D) Energy of activation✓

Q.9 In some reactions, a product formed acts as a catalyst. The phenomenon is called
A) Negative Catalysis
B) Activation of Catalyst
C) Hetergeneous catalysis
D) Autocatalysis✓

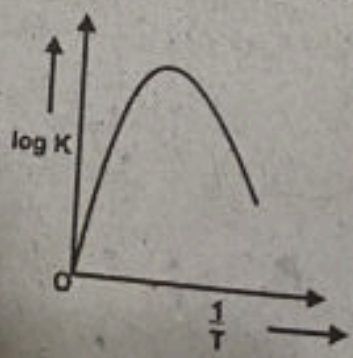
Q.10 The reaction rate in forward direction decreases with the passage of time because
A) Concentration of reactants decrease✓
B) Concentration of product decreases
C) The order of reaction changes
D) Temperature of the system changes

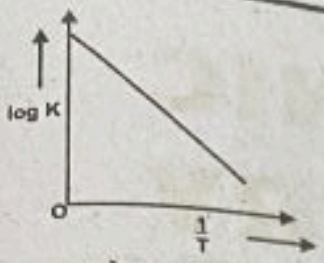
Q.11 By considering Arrhenius equation, the graph between '$_T$' and 'log K' given a curve of the type:

A)

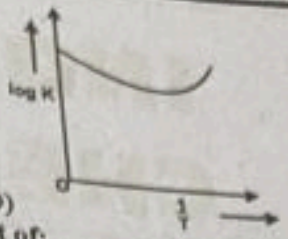


B)





C)



D)

Q.12 In zero order reactions, the rate is independent of:
A) Concentration of the product
B) Concentration of the reactant✓
C) Temperature of the reaction
D) Surface area of the product

Q.13 If the reactant or product of a chemical reaction can absorb ultraviolet, visible or infrared radiation, then the rate of a chemical reaction can best be measured by which one of the following methods?
A) Chemical method
B) Spectrometry✓
C) Graphical method
D) Differential method

Q.14 For the reaction $2NO + O_2 \rightleftharpoons 2NO_2$, the rate equation for the forward reaction is
A) Rate = k [NO][O_2]
B) Rate = k [NO]^2 [O_2] ✓
C) Rate = k [NO_2]^2
D) Rate = k [NO_2]

Q.15 In the half-life of an element, the equation for the number of decaying atoms is given by
A) $\Delta \propto - N\Delta t$✓
B) $\Delta N = KN\Delta t$
C) $\Delta N \propto -n\Delta t$
D) $\Delta N = -\Delta N\Delta t$

Q.16 When the change in concentration is 6×10^{-4} mol dm^{-3} and time for that change is 10 seconds, the rate of reaction will be
A) 6×10^{-3} mol dm^{-3} sec^{-1}
B) 6×10^{-4} mol dm^{-3} se^{-1}
C) 6×10^{-2} mol dm^{-3} sec^{-1}
D) 6×10^{-5} mol dm^{-3} sec^{-1}✓

If the reactant 'B' is in excess, the order of reaction with respect to 'A' in given rate law, Rate = k[A]^2[B] is:
A) 2nd order reaction✓
B) 1st order reaction
C) Pseudo 1st order reaction
D) 3rd order reaction

Q.17 The rate constant 'k' is 0.693 min^{-1}. The half-life for the 1st order reaction will be:
A) 1 min✓ B) 0.693 min C) 2 min D) 4 min

Q.18 Rate of first order reaction depends on_____:
A) Concentration of one reactant✓
B) Concentration of two reactants
C) Concentration of three reactants
D) Independent of the initial concentration

Q.19 Gas is enclosed in a container of 20cm^3 with the moving piston. According to kinetic theory of gases what will be the effect on freely moving molecules of the gas if temperature is increased from 20°C in 100°C?:
A) Volume will be increased✓
B) Pressure will become one half
C) Temprature has no effect on freely moving molecules
D) Colliding capability of molecule will become lower

Q.20 Role of a catalyst in a chemical reaction is to:
A) increase rate of a reaction✓
B) decrease rate of a reaction
C) decreases yield of a reaction
D) increase yield of product

INORGANIC CHEMISTRY

Inorganic chemistry deals with synthesis and behavior of *inorganic* and organometallic compounds. This field covers all *chemical* compounds except the myriad of organic compounds (carbon-based compounds, usually containing C-H bonds), which are the subjects of organic *chemistry*.

Periods

Q.1 **Which of the following sulphates is not soluble in water?**
A) Sodium Sulphate
B) Barium Sulphate✓
C) Potassium Sulphate
D) Zinc Sulphate

Q.2 **White lead has one of the following properties**
A) Acidic
B) Crystalline
C) Amorphous✓
D) Neutral

Q.3 **In Modern Periodic Table, the elements in Group II-B are:**
A) Zn, Cd, Pb
B) Zn, Cd, Hg✓
C) Zn, Cd, Ba
D) Zn, Cd, Bi

Q.4 **Hydrogen loses an electron to form:**
A) H^+✓
B) $H2^{-2}$
C) H
D) H^-

Q.5 **At which condition are hydrides of alkaline earth metals formed:**
A) At high pressure✓
B) At room temperature
C) At high temperature
D) None of the above

Q.6 **Which metal carbide is formed readily by the direct reaction?**
A) Rubidium
B) Potassium
C) Sodium
D) Lithium✓

Q.7 **Asbestos is hydrated _____ magnesium silicate.**
A) Calcium✓
B) Aluminium
C) Barium
D) Carbon

Q.8 **Which Noble Gas is used in bacterial lamps?**
A) Xenon✓
B) Radon
C) Argon
D) Krypton

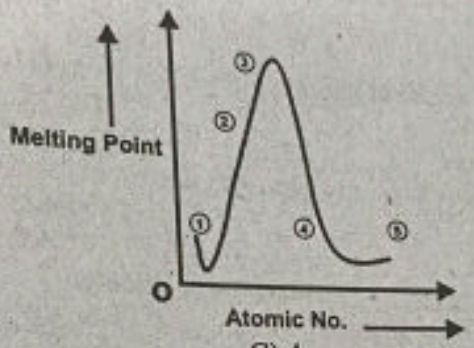
Q.9 **The elements of IIIA to VIIIA subgroups except He are known as _____ block elements.**
A) q.
B) s.
C) p.✓
D) None of these.

Q.10 **Na may be denoted by _____ electron configuration notation**
A) $1s^2 2s^1$.
B) [Ar] $4s^1$.
C) [Ne] $3s^1$.✓
D) None of these.

Q.11 Which is the best drying agent in desiccators?
A) KOH.
B) Gypsum.
C) $CaCl_2$.✓
D) Silica sand.

Q.12 Carbon exists as allotropes, which are different crystalline or molecular forms of the same substance. Graphite and diamond are allotropes of carbon. Diamond is a non-conductor whereas graphite is a good conductor because:
A) Graphite has a layered structure
B) In graphite, all valence electrons are tetrahedrally bound
C) In graphite one of valence electron is free to move✓
D) Graphite is soft and greasy

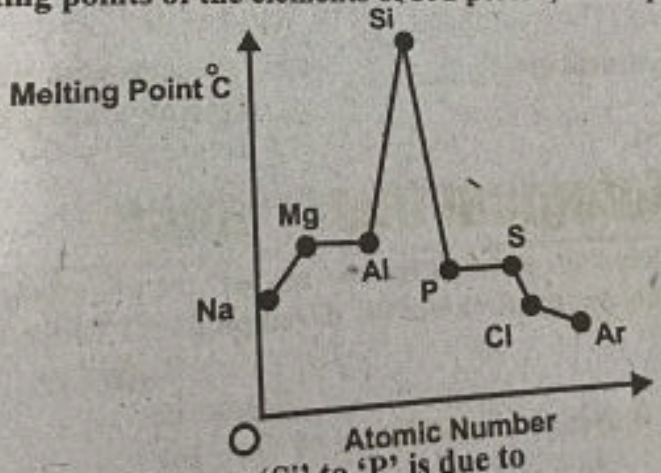
Q.13 The diagram below is a plot of melting points of elements of second period against their atomic numbers. Lithium and fluorine are placed at the extreme ends of the plot, on the basis of melting points where will you place Carbon among the empty slots on the plot?



A) 1
B) 2
C) 4
D) 3✓

Q.14 Which one remains same along a period?
A) Atomic radius
B) Melting point
C) Number of shells (orbits)✓
D) Electrical conductivity

Q.15 The trends, in melting points of the elements of 3rd period, are depicted in figure below.



The sharp decrease observed from 'Si' to 'P' is due to
A) Decrease in atomic radius from 'Si' to 'P'
B) Change in bonding and structure of two elements✓
C) Different universities of two elements
D) Increase in electron density from 'Si' to 'P'

Groups

Q.1 Which of the following carbonates of alkali metals is not stable towards heat and is decomposed on heating to its oxide along with liberation of CO_2?
A) Li_2CO_3✓
B) $MgCO_3$
C) K_2CO_3
D) Na_2CO_3

Q.2 The trend in the densities of elements of Group III-A of the Periodic Table is
A) A gradual increase✓
B) A gradual decrease
C) First decrease then increase
D) First increase then decrease

Q.3 $KMnO_4$ acts as a
A) Reducing agent
B) Excellent precipitating reagent
C) Germicide
D) Oxidizing agent✓

Q.4 In Modern Periodic Table, the elements in Group II-B are:
A) Zn, Cd, Pb
B) Zn, Cd, Hg✓
C) Zn, Cd, Ba
D) Zn, Cd, Bi

Q.5 At which condition are hydrides of alkaline earth metals formed:
A) At high pressure✓
B) At room temperature
C) At high temperature
D) None of the above

Q.6 Which metal carbide is formed readily by the direct reaction?
A) Rubidium
B) Potassium
C) Sodium
D) Lithium✓

Q.7 Asbestos is hydrated _____ magnesium silicate.
A) Calcium✓
B) Aluminium
C) Barium
D) Carbon

Q.8 In many of its properties _____ is quite different from the other alkali metals.
A) Li.✓
B) Be.
C) Na.
D) K.

Q.9 Name the rare halogen among the following.
A) F.
B) Cl.
C) I.
D) At.✓

Q.10 Concentrated nitric acid gives _____ when it reacts with tin.
A) Nitric oxide.
B) Meta stannic acid.
C) Ammonium nitrite.✓
D) None of these.

Elements of Biological Importance

Q.1 The presence of calcium is essential for the normal development of plants. An adequate supply of calcium appears to stimulate the development of which part of the plants?
A) Leaves
B) Fruits
C) Root hairs✓
D) Branches

Q.2 The noble gas which is used in radiotherapy of cancer is
A) Radon✓
B) Xenon
C) Krypton
D) Argon

Q.3 The coagulant used in raw water to precipitate suspended impurities is
A) Caustic soda
B) Lime water
C) Alum✓
D) Soda ash

Q.4 The whiteness of the recycled newspaper is improved by treating it with:
A) Sodium hydroxide
C) Super oxides

B) Per oxides✓ D) Normal oxides

Q.5 Each molecule of haemoglobin is made up of nearly:
A) 11000 atoms C) 10000 atoms✓
B) 6600 atoms D) 6800 atoms

Q.6 Which metal occurs as skeletal material in egg shell?
A) Calcium✓ C) Beryllium
B) Barium D) Strontium

Q.7 Which Noble Gas is used in bacterial lamps?
A) Xenon✓ C) Argon
B) Radon D) Krypton

Q.8 _____ serve as carriers of heredity from one generation to the other.
A) Lipids. C) Formaldehydes.
B) Caseins. D) Nucleoproteins.✓

Transition Elements

Q.1 The geometry of the complexes depends upon the type of _____ taking place in the valence shell of the central metal atom
A) Hybridization✓ C) Deprotonation
B) Protonation D) Dissociation

Q.2 Formula of lead suboxide is:
A) Ph_2O_3 C) PhO
B) Pb_2O✓ D) Pb_3O_4

Q.3 Colour of the transition metal ions/ compounds is due to the electrons present in:
A) d-orbital✓ C) p-orbital
B) s-orbital D) None of the above

Q.4 Chromyl Chloride Test is performed to confirm:
A) Cl^- ions✓ C) $PO4^{-3}$ ions
B) $SO4^{-2}$ ions D) Cr^{+3} ions

Q.5 The percentage of carbon in medium carbon steel is
A) 0.7-1.5. C) 0.2-0.7.✓
B) 0.1-0.2. D) 1.6-2.00.

Q.6 Which of the following is pale yellow to reddish yellow in color?
A) Pb_2O. C) PbO.✓
B) PbO_2. D) $2PbCO_3.Pb(OH)_2$.

Q.7 $Al_2F_2SiO_4$ is named as
A) Gibbsite. C) Bauxite.
B) Emerald.✓ D) Cryolite.

Q.8 In contact process, the catalyst used for the conversion of Sulphur dioxide to Sulphur trioxide is:
A) Magnesium oxide C) Silicon dioxide
B) Aluminum oxide D) Vanadium pentoxide✓

Q.9 The unpolluted natural rain water is slightly acidic due to the reaction of rain water with:
A) Sulphur dioxide✓ C) Carbon dioxide
B) Oxides of nitrogen D) Hydrogen present in air

Q.10 In the Haber's process for the manufacturing of ammonia, nitrogen is taken from:
A) Proteins occurring in living bodies C) Air✓
B) Ammonium salts obtained industrially D) Mineral containing nitrates

ORGANIC CHEMISTRY

Organic chemistry is the study of the structure, properties, composition, reactions, and preparation of carbon-containing compounds, which include not only hydrocarbons but also compounds with any number of other elements, including hydrogen (most compounds contain at least one carbon–hydrogen bond), nitrogen, oxygen, halogens, phosphorus, silicon, and sulfur. This branch of chemistry was originally limited to compounds produced by living organisms but has been broadened to include human-made substances such as plastics. The range of application of organic compounds is enormous and also includes, but is not limited to, pharmaceuticals, petrochemicals, food, explosives, paints, and cosmetics.

Fundamental Principles

Q.1 **A gasoline of higher octane number can be obtained by**
A) Oxidative cleavage
B) Thermal cracking
C) Catalytic cracking✓
D) Steam cracking

Q.2 **Ethyne molecule is formed when two carbon atoms joined together to form a sigma bond by**
A) sp-s overlap
B) sp^3-sp^3 overlap
C) $2p_y$-2py overlap
D) sp-sp overlap✓

Q.3 **The formula of acrylonitrile is:**
A) CH_3=CH—CN✓
B) CH_3—CH_2—CH_2—CN
C) CH_3—CH_2—CN
D) CH_3—CN

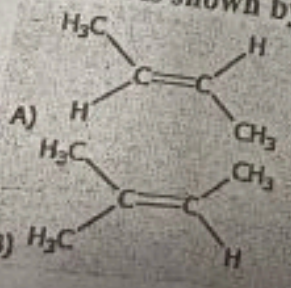
Q.4 **The compound with an atom, which has unshared pair of electrons is called:**
A) Nucleophile✓
B) Electrophile
C) Protophile
D) None of the above

Q.5 **1-chloropropane and 2-chlorpropane are isomers of each other, the type of isomerism in these two is called:**
A) Cis-trans isomerism
B) Chain isomerism
C) Position isomerism✓
D) Functional group isomerism

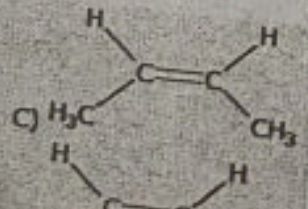
Q.6 **Ethene on polymerization, gives the product polyethene. This reaction may be called as**
A) Addition✓
B) Condensation
C) Substitution
D) Pyrolysis

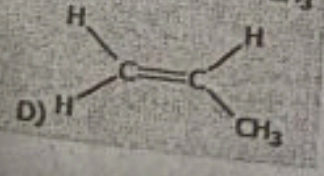
Q.7 **In the following, which one is free radical?**
A) Cl^-
B) Cl^+
C) Cl2
D) $Cl^\bullet$✓

Q.8 **The cis-isomerism is shown by:**

A)


B)

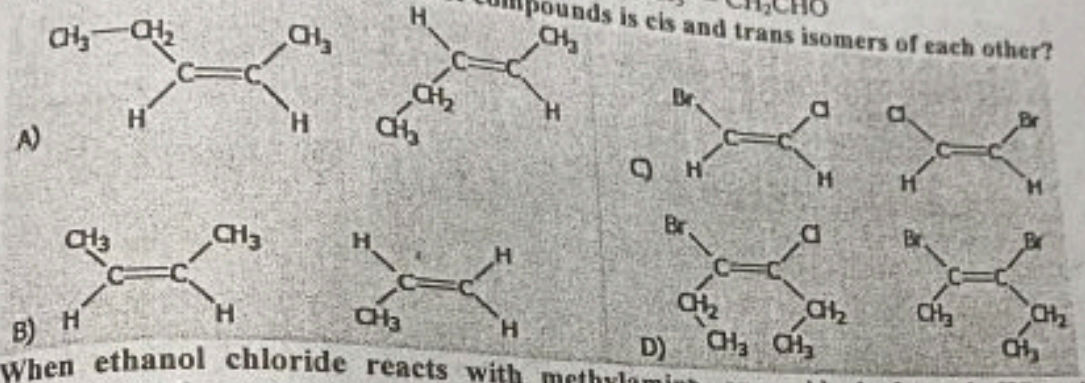
C)


D)


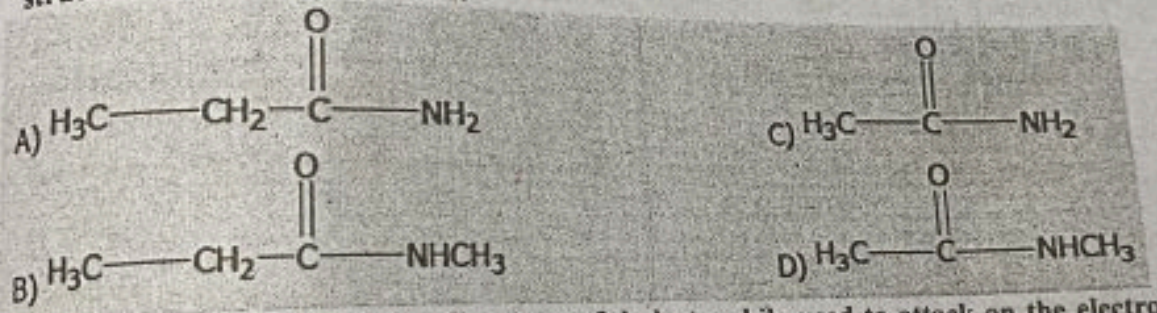
Q.9 Select the nucleophile from the following examples:
A) NO_2
B) NH_3✓
C) NO_2^+
D) N^+H_4

Q.10 Which one of the following compound is a ketone?
A) $CH_3 - O - CH_2 - CH_3$✓
B) $CH_3 - CO - CH_2 - CH_3$
C) $CH_3COCOOH$
D) $CH_3 - CH_2CHO$

Q.11 Which one of the following pair of compounds is cis and trans isomers of each other?

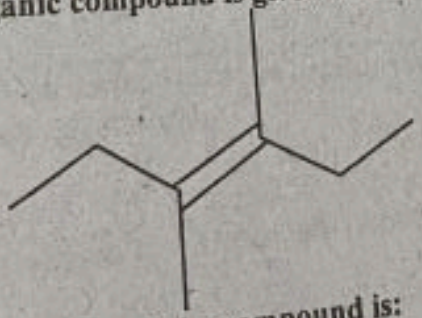


Q.12 When ethanol chloride reacts with methylamine, an amide is formed. What is the structure of the amide formed?



Q.13 Which one of the following is a powerful electrophile used to attack on the electrons of benzene ring?
A) $FeCl_2$
B) $FeCl_4^-$
C) Cl^+✓
D) Cl_2

Q.14 Skeletal formula of an organic compound is given below:



It is a hydrocarbon. IUPAC name of the compound is:
A) 3, 3-dimethyl-3-hexene
B) 3, 4-dimethyl-3-hexene✓
C) 3-hexene
D) 2,3-dimethyl-1-hexene

Q.15 Which one of the following pairs can be cis-trans isomer to each other?
A) $CHCl=CCl_2$ and $CH_2=CH_2$
B) $CHCl=CH_2$ and $CH_2=CHCl$
C) $CH_3\text{-}CH=CH\text{-}CH_3$ and $H_3CCH=CH\text{-}CH_3$✓
D) $CH_3\text{-}CH_3$ and $CH_2=CH_2$

Hydrocarbon

Q.1 The introduction of NO2 group in benzene ring is called 'Nitration'. The nitration of benzene takes place when it is heated with a 1:1 mixture of _____ at 50 °C-55 °C.
A) Conc. HNO_3 and conc. HCl
B) Conc. HNO_3 and conc. Acetic acid
C) Conc. HNO_3 and $H3PO_4$
D) Conc. HNO_3 and conc. $H2SO_4$✓

Q.2 Sublimation is used to purify
A) Ammonium sulphate
B) Sodium chloride
C) Benzoic acid✓
D) Lead carbonate

Q.3 During nitration of benzene the active nitrating agent is:
A) $NO2^-$ B) NO3 C) HNO2 **D) $NO2^+$✓**

Q.4 Which compound is the most reactive one?
A) Ethyne B) Benzene C) Ethane **D) Ethene✓**

Q.5 Which one of the following compounds show cis-trans isomerism?
A) 1-butene
B) 1-hexene
C) 1-bromo-2-chloropropane✓
D) Propene

Q.6 Which element forms long chains alternating with oxygen?
A) Carbon. B) Nitrogen. C) Silicon. **D) All of these.✓**

Q.7 Which bond will break when electrophile attacks an alcohol?
A) O – H.✓ B) Both A and B. C) C – O. D) None of these.

Q.8 The extent of un-saturation in a fat is expressed as its
A) Acid number.
B) Iodine number.✓
C) Saponification number.
D) None of these.

Q.9 Alkanes containing _____ carbon atoms are waxy solids.
A) up to 4.
B) 5 to 17.
C) 18 or more.✓
D) None of these.

Q.10 Hydrogen passed through phenol at 150 °C in the presence of _____ catalyst gives cyclohexanol.
A) Tin.
B) Nickel.✓
C) Iron.
D) Sodium.

Alkyl Halides

Q.1 During SN_2 reactions, configuration of the alkyl halide molecule:
A) Gets inverted✓
B) Remains same
C) Depends upon the carbon atom
D) Depends upon the electronegativity of halide

Q.2 Grignard reagents are prepared by the reaction of magnesium metal with alkyl halides in the presence of
A) Dry Ether✓
B) Sodium Lead Alloy
C) Alcohol
D) Water

Q.3 Methanol is prepared from carbon monoxide and hydrogen. The catalyst used for this reaction is
A) $ZnO + CoO_2$
B) $ZnO + CuO$
C) $ZnO + Ag_2O$
D) $Cr_2O_3 + ZnO$✓

Q.4 Ethanol reacts with Ammonia to produce ethyl amine, the catalyst is
A) $ZnCl_2$ C) C_6H_5N

B) ThO✓
D) Cr_2O_3

Q.5 Grignard reagents are prepared by the reaction of magnesium metal with alkyl halides in the presence of:
A) Dry Ether✓
B) CS_2
C) Alcohol
D) CCl_4

Q.6 When n-butyl magnesium iodide is treated with water, the product is:
A) n-butane✓
B) Iso-butane
C) Propane
D) Alcohol

Q.7 When purely alcoholic solution of sodium/potassium hydroxide and halogenoalkanes are reacted an alkene is formed, what is the mechanism of reaction?
A) Elimination✓
B) Dehydration
C) Debromination
D) Reduction of benzene

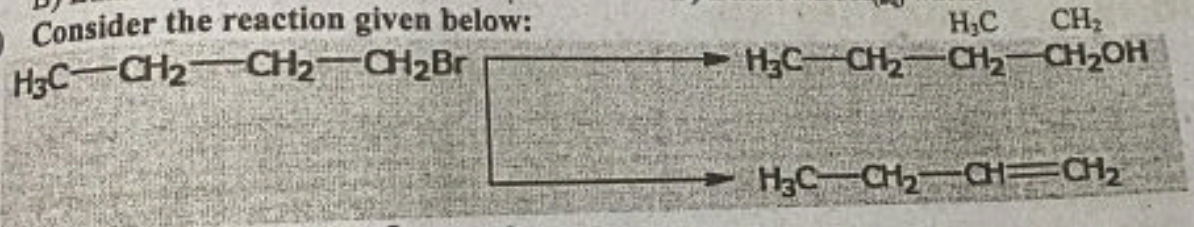
Q.8 The organic compound carbon tetrachloride is used as:
A) Lubricant
B) Solvent✓
C) Oxidant
D) Plastic

Q.9 The alkaline hydrolysis of bromoethane shown below gives alcohol as the product:

$$H_3C—CH_2—Br \longrightarrow H_3C—CH_2—OH$$

The reagent and the condition used in this reaction may be:
A) H_2O at room temperature
B) Ethanol, heat
C) KOH in alcohol
D) Dilute $NaOH_{(aq)}$ warm✓

Q.10 Consider the reaction given below:



Which statement is true?
A) Reagent for I is KOH in alcohol
B) Reagent for II is KOH in aqueous medium
C) Reaction I is Debromination
D) Reaction II is elimination✓

Alcohols and Phenols

Q.1 Dissociation constant of phenol is
A) 1.2×10^{-10}
B) 1.2×10^{10}
C) 1.3×10^{10}
D) 1.3×10^{-10}✓

Q.2 $CO + 2H2 \xrightarrow[Y]{X} CH_3OH$

X and Y are:
A) $ZnO + Al_2O_3$ and 450 °C: 200 atm
B) $ZnO + Cr_2O_3$ and 450 °C: 200 atm
C) Al2O3 + Cr_2O_3 and 200 °C: 200 atm
D) $ZnO + Cr_2O_3$ and 450 °C: 200 atm

Q.3 Phenol reacts with concentrated H2SO4 to give:
A) ortho hydroxy benzene sulphonic acid
B) meta hydroxy benzene sulphonic acid
C) ortho and para hydroxy benzene sulphonic acid✓
D) para hydroxy benzene sulphonic acid

Q.4 Phenol can be distinguished from alcohol by adding:

A) Br_2/H_2O✓
B) Cl_2/H_2O
C) $FeSO_4$
D) $FeCl_3$

Q.5 The products of the fermentation of a sugar are ethanol and
A) Water.
B) Oxygen.
C) Carbon dioxide.✓
D) Sulfur dioxide

Q.6 Name the partially miscible liquids from the following?
A) Alcohol-ether.
B) Nicotine-water.✓
C) Benzene-water.
D) Both A and B.

Q.7 Ethanol-water is _____ mixture.
A) Azeotropic.✓
B) Ideal.
C) Benedict's.
D) Aliphatic.

Q.8 CH_3-O-CH_3 is example of _____ isomerism.
A) Metamerism.
B) Functional group.✓
C) Chain.
D) Position.

Q.9 An alcohol is converted to an aldehyde with same number of carbon atoms as that of alcohol in the presence of $K_2Cr_2O_7/H_2SO_4$ the alcohol is:
A) $CH_3Cl(CH)_2OH$
B) $CH_3CH_2CH_2OH$✓
C) $(CH_3)_3COH$
D) $(CH_3)_3CHOH$

Q.10 Which enzyme is involved in the fermentation of glucose:
A) Zymase✓
B) Invertase
C) Urease
D) Diastase

Aldehydes and Ketones

Q.1 When a hydrogen atom is removed from benzene, the group left behind is called
A) Alkyl group
B) Phenyl group✓
C) Benzyl group
D) Methyl group

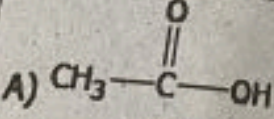
Q.2 Dry distillation of a mixture of calcium salts of formic acid and acetic acid results into the formation of
A) Formaldehyde
B) Acetaldehyde✓
C) Calcium acetate
D) Sodium acetate

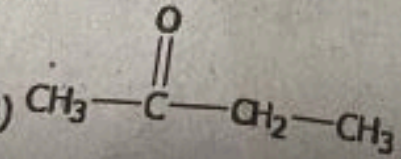
Q.3 Brick red precipitates are formed when aldehydes react with
A) Sodium borohydride
B) Sodium bisulphite
C) Sodium nitroprusside
D) Fehling's solution✓

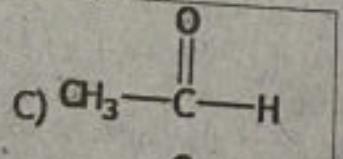
Q.4 In the conversion of ethylene into acetaldehyde, cupric chloride acts as:
A) Initiator
B) Promoter✓
C) Catalyst
D) Reactant

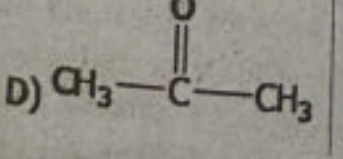
Q.5 When acetone is heated in the presence of $K_2Cr_2O_7/H_2SO_4$, the products formed are;
A) Maleic Acid and Fumaric Acid
B) Acetic Acid and Formic Acid✓
C) Formic Acid and Oxalic Acid
D) Oxalic Acid and Acetic Acid

Q.6 Which of the following compounds will react with Tollen's Reagent?

A) 

B) 

C) 

D) 

Q.7 Aldehydes can be synthesized by the oxidation of
A) Primary alcohols.✓ B) Secondary alcohols. C) Organic acids. D) Inorganic acids.

Q.8 Which of the following is used to make chloral hydrate?
A) Acetaldehyde.✓ B) Formaldehyde. C) None of these. D) Both A and B.

Q.9 Consider the following reaction:
$R—CHO + {}_2[Ag(NH_3)_2]OH \longrightarrow R—COONH_4 + 2Ag + 2NH_3 + H_2O$
This reaction represents one of the following tests.
A) Fehling test B) Benedict test C) Ninhydrin test D) Tollens test✓

Q.10 In the below reaction, the nucleophile is:

$$HCHO + HCN \longrightarrow H_2C(OH)—CN$$

A) CN—✓ B) HCl C) Cl D) OH

Carboxylic Acids

Q.1 The strongest acid among the following is
A) HF B) HCl C) HI✓ D) HBr

Q.2 Symmetrical alkanes can be produced by
A) Sabatier Sender's Reaction B) Hydrogenolysis Reaction C) Reduction Reaction D) Kolbe's Electrolytic Reaction✓

Q.3 Hydrolysis of cyano group by an aqueous acid results into
A) Carboxylic Acid✓ B) Acid Amide C) Cyanohydride D) Formaldehyde

Q.4 The protonation of carboxylic acid is:

A) $CH_3-C(=O)-OH + H^+ \rightleftharpoons CH_3-C(=O^+H)-OH$

B) $CH_3-C(=O)-OH + H^+ \rightleftharpoons CH_3-C(O^+H_2)-OH$

C) $CH_3-C(=O)-OH + H^+ \rightleftharpoons CH_3-C(=O)-OH_2^+$

D) $CH_3-C(=O)-OH + H^+ \rightleftharpoons CH_3-C(=O^+H)-OH$

Answer: A

Q.5 Acetic acid is called _____ acid.
A) Methanoic. B) Ethanoic.✓ C) Propanoic. D) Butanoic.

Q.6 $CH_3COOH + PCl_5 \longrightarrow ?$
The products of the above reaction are:
A) $CH_3COI + POCl_3 + HCl$✓ B) $CH_3COI + POCl_2 + HCl$ C) $CH_3Cl + POCl_3 + HCl$ D) $CH_3COCl + POCl_3 + H_2$

Q.7 $CH_3CN + HCl \longrightarrow A + B$ (in the presence of water)

In the above reaction, A and B are:
A) Acetic acid and acid amide B) Acetic acid and ammonia
C) Acetic acid and methyl chloride D) Acetic acid and ammonium chloride✓

Q.8 Consider the following reaction:

$$CH_3COOH + Mg\ (metal) \longrightarrow ?$$

What product will form?
A) Magnesium formate C) Magnesium ion
B) Magnesium acetate✓ D) Carboxylate ion

Q.9 In the below reaction the nucleophile which attacks on the carbon atom of acid is:
A) OH– C) Cl–✓
B) P D) H–

Q.10 When ethanol chloride reacts with methylamine, an amide is formed. What is the structure of the amide formed?

A) $H_3C-CH_2-C(=O)-NH_2$
B) $H_3C-CH_2-C(=O)-NHCH_3$
C) $H_3C-C(=O)-NH_2$
D) $H_3C-C(=O)-NHCH_3$

Amino Acids

Q.1 The nature of the amino acid 'lysine' is
A) Neutral B) Amphoteric C) Acidic D) Basic✓

Q.2 The —NH—CO is called:
A) Amide group✓ B) Protein linkage C) Amino group D) Peptide linkage

Q.3 Which one of the following is an alpha amino acid?

A) $H_3C-CH(NH_2)-COOH$
B) $H_3C-C(H)(CH_2-NH_2)-COOH$
C) $H_3C-CH(NH_2)-CH_2-COOH$
D) $H_3C-C(H)(HOOC)-CH(NH_2)-CH_3$

Q.4 Which of the following has an amino R-group?
A) Lysine✓ C) Valine
B) Proline D) Alanine

Q.5 At intermediate value of pH, amino acids form Zwitter ions containing:
A) $-N^+H_3$ and COO^-✓ C) $-N^+H_3$ and COOH
B) $-NH_3$ and COO^- D) $-NH_3$ and COOH

Macromolecules

Q.1 Glucose is converted into ethanol by the enzyme _____ present in yeast:
A) Urease C) Sucrase

B) Invertase D) Zymase✓

Q.2 **The catalyst used for the preparation of acrylonitrile is**
A) Cu_2Cl_2 and NH_4Cl✓ C) Cu_2Cl_2 and NH_4OH
B) Al_2O_3 and NH_4Cl D) Cu_2Cl_2 and Al_2O_3

Q.3 **The calcium sulpho-aluminate is**
A) $Co.Al_2O_3.3CaSO_4.6H_2O$ **C) $3Ca.Al_2O_3.3CaSO_4.2H_2O$✓**
B) $3Ca.Al_2O_3.CaSO_4.2H_2O$ D) $3Ca.Al_2O_3.3CaSO_4.6H_2O$

Q.4 **Each molecule of haemoglobin is made up of nearly:**
A) 11000 atoms **C) 10000 atoms✓**
B) 6600 atoms D) 6800 atoms

Q.5 **Which acid is used in the manufacture of plastics?**
A) Carbolic Acid **C) Carbonic Acid✓**
B) Acetic Acid D) Oxalic Acid

Q.6 **In synthetic fibres _____ bonding is responsible for tensile strength.**
A) Nitrogen. C) Oxygen.
B) Hydrogen. **D) None of these.✓**

Q.7 **_____ are product of reaction of an alcohol and aromatic bi-functional acids.**
A) Acrylic resins. C) PVCs.
B) Polyester resins.✓ D) Polyamide resins.

Q.8 **When hexane dioic acid is heated with hexamethylene diamine, the compound formed is:**
A) Polypeptide C) Ester
B) Addition polymer **D) Nylon 6,6✓**

Q.9 **Glucose and fructose are common examples of:**
A) Pentoses C) Heptoses
B) Hexoses✓ D) Butoses

Environmental Chemistry

Q.1 **Seawater has 5.65×10^{-3} g of dissolved oxygen in one kilogram of water. Concentration of O2 in parts per million is**
A) 5.65✓ C) 5.20
B) 7.69 D) 4.11

Q.2 **Micronutrients are required in quantity ranging from:**
A) 6 – 200 g per acre✓ B) 4 – 40 g per acre
C) 6 – 200 kg per acre D) 4 – 40 kg per acre

Q.3 **Potassium fertilizers are especially useful for:**
A) Mango C) Wheat
B) Tobacco✓ D) Rice

Q.4 **The yellowish colour of photochemical smog is due to the presence of:**
A) Nitrogen dioxide✓ C) Nitrous oxide
B) Dinitrogen trioxide D) Nitric oxide

Q.5 **The incarnation process can reduce the volume of the water by:**
A) One half C) One third
B) Not affected **D) Two third✓**

Q.6 **The suspected liver carcinogen which also has negative reproduction and developmental effect on humans is:**
A) Iodoform C) Tropoform

B) Bromoform
D) Chloroform✓

Q.7 **Peroxyacetyl nitrate is an irritant to human beings and it effects:**
A) Nose
B) Stomach
C) Ears
D) Eyes✓

Q.8 **The increase in concentration of oxidizing agents in smog like H_2O_2 HNO_3, PAN and ozone in the air is called**
A) Carbonated smog
B) Nitrated smog
C) Photochemical smog✓
D) Sulphonated smog

Q.9 **Which is the metal, whose elevated concentration is harmful for fish as it clogs the gills thus causing suffocation?**
A) Sodium
B) Lead
C) Zinc
D) Aluminium✓

Q.10 **Aerobic decomposition of organic matter i.e. glucose by bacteria in water sediments produces:**
A) Propene
B) Ethane
C) Methane✓
D) Butane

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Biology

Introduction to Biology

|14 MCQs|

Q.1 **Which of the following is the lowest level of biological organization with respect to others?**
A) Multicellular organisms✓
C) Biosphere
B) Species
D) Population

Q.2 **At the cephalic end of primitive streak, closely packed cells form a local thickening known as:**
A) Henson's Node✓
B) Primitive Ridge
C) Gastrocoele
D) Primitive Gut

Q.3 **In plants, the red light favours:**
A) Enhancement of cell differentiation
C) Elongation of cells✓
B) Maturation of the cells
D) Enhancement of cell division

Q.4 **Syphilis is caused by**
A) Neisseria gonorrhoeae.
B) Treponema pallidum.✓
C) Cats worm.
D) Herpes simplex.

Q.5 **Which of the following diseases can be prevented through vaccination?**
A) AIDS and Cancer
B) Typhoid and Cancer
C) Malaria and AIDS
D) Measles and Mumps✓

Q.6 **Newly produced cells/individuals which are identical in each other are known as**
A) Genetically Modified✓
B) Transgenic Bacteria
C) Transgenic Animals
D) Clones

Q.7 **Which of the following is a blood borne disease?**
A) Hepatitis✓
B) Influenza
C) Cholera
D) Candidiasis

Q.8 **The control of pest has traditionally meant regulation by natural enemies, predators, parasites and pathogens. This type of control is known as**
A) Cultural Control
B) Pesticides Control
C) Biological Control✓
D) Insecticides Control

Q.9 **Population of different species (plants and animals) living in the same habitat form a**
A) Community✓
B) Biosphere
C) Ecosystem
D) Microhabitat

Q.10 **The part of the body which forms a structural and functional unit and is composed of more than one tissue is called**
A) Organ✓
B) Organ system
C) Organelle
D) Whole organism

Q.11 **A method in which pests are destroyed by using same living organisms or natural enemies is called.**
A) Pasteurization
B) Biological control✓

C) Integrated disease management
D) Genetic engineering

Q.12 Chemicals produced by microorganisms which are capable of destroying the growth of microbes are called
A) Antigen
B) Antiseptics
C) Biocidal
D) Antibiotics✓

Q.13 The simplest independent unit of life is known as:
A) Bacterial colony
B) Chloroplast
C) Cell✓
D) DNA

Q.14 The plants having foreign DNA incorporated into their cells are called:
A) Clonal plants
B) Biotech plants
C) Transgenic plants✓
D) Tissue cultured plants

Q.15 Pasteurization technique is widely used for preservation of:
A) Water
B) Milk products✓
C) Heat
D) Vaccines

Cell Biology / Cell Division

Q.1 Microtubules of spindle fibres are composed of a protein called
A) Tubulin✓
B) Myosin
C) Actin
D) Troponin

Q.2 The kinetochore fibres contract and spindle or pole fibres elongate during
A) Prophase I
B) Telophase I
C) Metaphase I
D) Anaphase I✓

Q.3 Cell death due to tissue damage is called
A) Necrosis✓
B) Apoptosis
C) Metastasis
D) Epistasis

Q.4 An activated enzyme consisting of polypeptide and a cofactor is known as
A) Amylase
B) Haloenzyme✓
C) Apoenzyme
D) Coenzyme

Q.5 In prokaryotic cell, wall strengthening material is
A) Cellulose
B) Chitin
C) Silica
D) Peptidoglycan✓

Q.6 The entire cell wall of bacteria is often regarded as a single huge molecule or molecular complex called
A) Capsule
B) Slime capsule
C) Secondary wall
D) Sacculus✓

Q.7 Internal program of events and sequences of morphological changes by which cell commit a suicide is collectively called:
A) Necrosis
B) Metastasis
C) Epistasis
D) Apoptosis✓

Q.8 Phragmoplast is formed from vesicle which originates from:
A) Smooth Endoplasmic Reticulum
B) Ribosome
C) Golgi Complex✓
D) Rough Endoplasmic Reticulum

Q.9 A group of ribosomes attached to messenger RNA is known as:
A) Ribosome
B) Nucleosome

C) Lysosome

Q.10 **Detoxification of harmful drugs within the cell is done by:**
A) Nucleolus B) Ribosomes
C) Smooth Surface Endoplasmic Reticulum D) Food Vacuoles

Q.11 **During photorespiration, the glycolate is converted into glycine in a structure of cell called:**
A) Golgi Bodies B) Mitochondria
C) Glyoxisome **D) Peroxisome✓**

Q.12 **Which bond is the potential source of chemical energy for cellular activities?**
A) C-N.✓ B) C-H.
C) C-O. D) H-O.

Q.13 **Down's syndrome is a result of non-disjunction of_____ pair of chromosomes that fails to segregate:**
A) 21st✓ B) 18th
C) 22nd D) 24th

Q.14 **During animal cell division, the spindle fibres are formed from**
A) Mitochondria B) Ribosomes
C) Centrioles✓ D) Lysosomes

Q.15 **Which component of the cell is concerned with cell secretions?**
A) Plasma membrane B) Cytoskeleton
C) Golgi complex✓ D) Mitochondria

Biological Molecules

Q.1 **When an electron pair is shared between two atoms**
A) Two covalent bonds are formed **B) Single covalent bond is formed✓**
C) Hydrogen bond is formed D) Ionic bond is formed

Q.2 **An activated enzyme consisting of polypeptide and a cofactor is known as**
A) Amylase **C) Haloenzyme✓**
B) Apoenzyme D) Coenzyme

Q.3 **_____ forms weak linkages with enzymes and their effect can be neutralized completely or partly by an increase in the concentration of the substrate.**
A) Only competitive Inhibitors **C) Reversible inhibitors✓**
B) Irreversible inhibitors D) Both reversible and irreversible inhibitors

Q.4 **The reaction between the phosphate group of one nucleotide and hydroxyl group of another is a _____ synthesis in DNA molecule.**
A) Dehydration✓ B) Oxidation
C) Rehydration D) Reduction

Q.5 **Enzyme which attaches the Okazaki fragments in lagging strand is called:**
A) Restriction endonuclease B) DNA helicase
C) Primase **D) DNA ligase✓**

Q.6 **Haemoglobin exhibits:**
A) Secondary Structure **B) Quaternary Structure✓**

C) Primary Structure D) Tertiary Structure

Q.7 Pepsin enzyme is produced in an inactive form and is activated in situation when it is required because:
A) Not produced in complete form
C) Quite capable of destroying cells internal structure✓
B) It does not work efficiently at that time
D) None of the above

Q.8 Immediate source of energy for cellular metabolism is:
A) Lipids B) Carbohydrates
C) ATP✓ D) Proteins

Q.9 Name the human tissues that contain about 85% water.
A) Nerve cells. **B) Brain cells.✓**
C) Bone cells. D) None of these.

Q.10 Which of the following gives blue color with iodine?
A) Starch.✓ B) Glycogen.
C) Cellulose. D) All of these.

Q.11 The optimum temperature for enzymes of human body is
A) 32 °F. B) 313 K.
C) 46 °C. **D) 37 °C.✓**

Q.12 Name the human tissues that contain about 85% water
A) Nerve cells. **B) Brain cells.✓**
C) Bone cells. D) None of these.

Q.13 The covalent bond formed between two monosaccharides is called
A) Glycosidic Bond✓ B) Peptide Bond
C) Hydrogen Bond D) Disulphide

Q.14 The bond formed between glucose and fructose form sucrose is
A) 1,4 Glycosidic Linkage B) 1,6 Glycosidic Linkage
C) 1,2 Glycosidic Linkage✓ D) 1,3 Glycosidic Linkage

Q.15 In an amino acid in which the R-group is H, its name will be
A) Alanine B) Leucine
C) Glycine✓ D) Valine

Microbiology

Q.1 The first microbe to have the genome completely sequenced and was published on July 28th, 1995 was
A) Hyphomicrobium C) Haemophilus aquaticus
B) Haemophillus malariae **D) Haemophillus infulenzae✓**

Q.2 Chemically, viruses are made up of
A) Nucleic acid only **B) Nucleic acid and protein✓**
C) Protein only D) Core and coat

Q.3 Widespread epidemic disease, influenza is caused by
A) DNA virus B) DNA enveloped virus
C) RNA enveloped virus✓ D) RNA virus

Q.4 When the division of cells is in three planes, the arrangement is known as

A) Diplococcus
C) Sarcina✓
B) Streptococcus
D) Staphylococcus

Q.5 **Bacterial 'death rate' is equal to 'birth rate; in**
A) Lag phase
C) Log phase
B) Death phase
D) Stationary phase✓

Q.6 **Symptoms of Herpes Simplex is:**
A) Abdominal Pain
B) Vesicular lesions in the epithelial layer✓
C) Fever
D) Failure of immune system

Q.7 **The major cell infected by the HIV is:**
A) Leucocyte
C) Monocyte
B) Helper T-lymphocyte✓
D) B-lymphocyte

Q.8 **Which of the following is aerobic bacterium?**
A) Spirochete
C) Cyanobacteria
B) E. coli
D) Pseudosomanas✓

Q.9 **The giant amoebas inhabit mud at the bottom of fresh water ponds and obtain energy from:**
A) Microscopic bacteria
C) Aerobic bacteria
B) Anaerobic bacteria
D) Methanogenic bacteria✓

Q.10 **Penicillin is obtained from:**
A) Penicillium notatum✓
B) Aspergillus fumigatus
C) Aspergillus flavus
D) Penicillium chrysogenum

Q.11 **Which of the following components is less resistant to decay?**
A) Lignin
B) Chitin✓
C) Starch D) Cellulose

Q.12 **_____ are bioindicators of air pollution.**
A) Cyanobacteria
B) Mycorrhiza
D) Lichens✓
C) Fungi

Q.13 **Name the enveloped RNA virus that causes infusion hepatitis.**
A) HBV.
B) HCV.✓
D) None of these.
C) HAV.

Q.14 **In general, asexual reproduction is common in**
A) Humans.
B) Deuteromycota.✓
D) Basidiospores.
C) Basidiomycota.

Q.15 **Which of the following are spiral-shaped bacteria?**
A) Cocci.
B) Pseudomonas.
D) Vibrio.✓
C) Bacilli.

Q.16 **Which of the following is used for lowering blood cholesterol?**
A) Neurospora.
B) Aspergillus.
D) Lovastatin.✓
C) Griseofulvin.

Q.17 **Herpes simplex is caused by _____ virus.**
A) Enveloped RNA.
B) Glycogen.
D) Both B and C.
C) RNA tumor.

Q.18 **Name the cyanobacteria which are helpful in fixing atmospheric nitrogen.**
A) Heterocysts.✓
B) Akinetes.
D) Hormogonia.
C) Nostoc.

Q.19 Name the one involved in DNA replication.
A) Cysts. B) Ribosomes.
C) Mesosomes.✓ D) Spores.

Q.20 Which of the following has rootless sporophytes?
A) Psilopsida.✓ B) Lycopsida.
C) Tracheophyta. D) Sphenopsida.

Q.21 Which one of the following diseases caused by enveloped RNA virus and spread in epidemic form?
A) Influenza✓ B) Polio
C) Herpes Simplex D) Small Pox

Q.22 The structure which contains the gene for drug resistance bacteria are
A) Nucleoids B) Chromatin Bodies
C) Mesosomes **D) Plasmids✓**

Q.23 Antibiotics that kill microbes immediately are called
A) Microbistatic B) Biostatic
C) Microbicidal✓ D) Chemotherapeutic

Q.24 Which one of the following fungi causes vaginal thrush?
A) Candida✓ B) Tortula
C) Aspergillus D) Penicillium

Q.25 In HIV viruses, reverse transcriptase converts single-stranded RNA into double stranded viral DNA. This process is called
A) Translation B) Replication
C) Duplication **D) Reverse Transcriptase✓**

Kingdom Animalia

Q.1 Book lungs are present in arthropods for exchange of gases in class:
A) Crustacea B) Myriapoda
C) Insecta **D) Arachnida✓**

Q.2 Larvae of which group are similar to chordates?
A) Echinodermata✓ B) Arthropoda
C) Annelida D) Nematoda

Q.3 Trypanosoma is a human parasite causing:
A) African sleeping sickness✓ B) Indonesian sleeping sickness
C) European sleeping sickness D) American sleeping sickness

Q.4 The feeding stage of slime mold is a
A) Gastrozoid **B) Plasmodium✓**
C) Sporozoite D) Merozote

Q.5 Drug obtained from fungus used for lowing blood cholesterol is
A) Lovastatin✓ B) Ergotin
C) Cyclosporin D) Griseofulvin

Q.6 Fungi store surplus food in the form of
A) Cellulose B) Starch
C) Glycogen✓ D) Both B and C

Q.7 The ecological role of fungi as decomposers is paralleled only by

A) Prions
C) Algae
B) Bacteria✓
D) Viruses

Q.8 "Vascular System absent; gametophyte dominant, sporophyte attached to gametophyte; homosporous" are distinguishing characters of
A) Psiolpsida
C) Pteropsida
B) Angiosperms
D) Bryophyta✓

Q.9 Which of the following features differentiate angiosperms from gymnosperms?
A) Pollens disperse by air
C) Haploid microspores
B) Ovaries✓
D) Pollen tubes

Q.10 In Pakistan, the furniture wood is mainly obtained from the members of family:
A) Rosaceae
C) Solanaceae
B) Minosaceae
D) Fabaceae✓

Q.11 Which of the following is exclusive character of mammals?
A) Homeothermic
C) Hair✓
B) Poikliothermic
D) Four chambered heart

Q.12 A large group of parasitic protozoa, some of which causes various diseases such as malaria to humans, are:
A) Aschelminthes✓
C) Platyhelminthes
B) Annelida
D) Arthropods

Q.13 The gymnosperms are called 'Naked Seeded' plants because they bear naked:
A) Antheridia
C) Ovules✓
B) Fruits
D) Archegonia

Q.14 The integumented indehiscent mega sporangium is called:
A) Seed
C) Megagametophyte
B) Archegonium
D) Ovule✓

Q.15 Pulses are present in the family:
A) Caesalpinlaceae
C) Fabaceae✓
B) Gramineae
D) Mimosaceae

Q.16 It is an endoparasite of humans, cattle and pig that completes its life cycle in two hosts:
A) Tapeworm✓
C) Aurelia
B) Liver fluke
D) Planaria

Q.17 Tse-tse fly causes the sleeping sickness and skin diseases by transmitting:
A) Plasmodium
C) Trypanosoma✓
B) Anopheles
D) Insects

Q.18 Coelem is a cavity lined by:
A) Mesoderm✓
C) Endoderm
B) Epiderm
D) Ectoderm

Q.19 Sharks and rays are included in class:
A) Cyclostomata.
C) Chondrichthyes.✓
B) Osteichthyes.
D) Tetrapoda.

Q.20 Which of the following does not have specialized respiratory organs?
A) Hydra.✓
C) Birds.
B) Cockroach.
D) Both A and B.

Q.21 Humming birds belong to the category
A) Heterotherms.✓
B) Ectotherms.

D) None of these.
C) Endotherms.

Q.22 Name the vertebrates which are without jaws.
A) Osteichthyes. B) Chondrichthyes.
C) Cyclostomata.✓ D) None of these.

Q.23 Which of the following are called placental mammals?
A) Prototheria. B) Metatheria.
C) Eutheria.✓ D) All of these.

Q.24 Name the class without antennae.
A) Arachnida.✓ B) Insecta.
C) Myriapoda. D) Crustacea.

Q.25 The African sleeping sickness is caused by _____
A) Entamoeba histolytica. B) Zooflagellates.
C) Trypanosoma.✓ D) Ciliates.

Q.26 Which of the following does not belong to angiospermic families?
A) Picea.✓ B) Rosaceae.
C) Poaceae. D) Fabaceae.

Q.27 Which of the following damages wooden ships?
A) Sepia. **B) Teredo.✓**
C) Limax. D) Ostrea.

Q.28 Which of the following may build coral reefs along with coral animals?
A) Myxomycota. B) Green algae.
C) Brown algae. **D) Red algae.✓**

Q.29 Which of the following do not have a body cavity?
A) Pseudocoelomata. B) Coelomata.
C) Acoelomata.✓ D) None of these.

Q.30 Body cavity of round worms is called
A) Pseudocoelom✓ B) Acoelom
C) Coelom D) Enteron

Q.31 Fasciola is endoparasite of
A) Colon B) Small Intestine
C) Liver **D) Bile Duct✓**

Q.32 Trypanosoma is transmitted in human beings by
A) Plasmodium B) House Fly
C) Anopheles **D) Tsetse Fly✓**

Q.33 The nervous system develops from which of the following layer during embryonic development of animals
A) Mesoderm B) Endoderm
C) Ectoderm✓ D) Mesoderm and Endoderm

Q.34 Endosperm is formed as a result of
A) Pollination **B) Double Fertilization✓**
C) Self-Pollination D) Cross Pollination

Q.35 The male reproductive parts of the flower are called
A) Gynoecium **B) Androecium✓**
C) Calyx D) Corolla

Q.36 Fasciola is the name given to
A) Tapeworm **B) Liver fluke✓**

C) Planaria D) Earthworm

Q.37 **Ascaris is**
A) Diploblastic B) Haploid
C) Triploblastic✓ D) Acoelomate

Q.38 **During development, in an animal, mesoderm layer gives rise to**
A) Nervous System **B) Muscular and skeletal system✓**
C) Alimentary canal lining D) Mouth

Q.39 **Polymorphism is characteristic feature of**
A) Porifera B) Annelida
C) Cnidaria✓ D) Nematodes

Q.40 **When beef which is not properly cooked is consumed by humans, they become infected by:**
A) Tape worm✓ B) Pin worm
C) Hook worm D) Round worm

Q.41 **Sleeping sickness in humans is caused by:**
A) Trypanosoma✓ B) Anopheles
C) Plasmodium D) Andes

Q.42 **Schistosoma is a parasite that lives in the _____ of the host.**
A) Intestine B) Liver
C) Kidney **D) Blood✓**

Q.43 **The cavity between body wall and alimentary canal is:**
A) Coelom✓ B) Endoderm
C) Mesoderm D) Mesoglea

Q.44 **The layer which forms the lining of digestive tract and glands of digestive system is:**
A) Ectoderm **B) Endoderm✓**
C) Mesoderm D) Mesoglea

Q.45 **Ascaris is which one of the following?**
A) Ectoparasite B) Respiratory tract parasite
C) Intestinal parasite✓ D) Urinogenital tract parasite

Q.46 **Polymorphism is a feature exhibited by members of**
A) Coelenterates B) Porifera
C) Arthropoda✓ D) Platyhelminthes

Q.47 **Which one of the following is the primary host of liver fluke?**
A) Man B) Snail
C) Sheep✓ D) Dog

Q.48 **Which one of the following is an example of a free living carnivorous flatworm?**
A) Liver fluke B) Tapeworm
C) Dugesia✓ D) Schistosoma

Q.49 **The sources of staple food for man are plants which belong to the family:**
A) Mimosaceae B) Rosaceae
C) Poaceae✓ D) Fabaceae

Q.50 **_____ is a triploblastic organism.**
A) Jelly Fish **B) Tapeworm✓**
C) Sea Anemone D) Corals

Human Physiology – Digestive System

Q.1 **In human beings, what is the function of amylase in digestion?**
A) Digestion of triglycerides
B) Digestion of all types of food✓
C) Digestion of lipids
D) Digestion of carbohydrates

Q.2 **Where is the ileocolic sphincter located in your body?**
A) At the junction of esophagus and stomach
C) At the junction of stomach and small intestine
B) At the junction of ileum and large intestine✓
D) At the junction of small intestine and large intestine

Q.3 **The term which is employed to the loss of appetite due to fear of becoming obese is**
A) Obesity
B) Dyspepsia
C) Anorexia nervosa✓
D) Bulimia nervosa

Q.4 **At the junction between esophagus and the stomach there is a special ring of muscles called:**
A) Cardiac Sphincter✓
B) Esophageal Sphincter
C) Ileocolic Sphincter
D) Pyloric Sphincter

Q.5 **Hepatic and pancreatic secretions are also stimulated by a hormone called:**
A) Gastrin
B) Insulin
C) Secretin✓
D) Glucagon

Q.6 **Like pepsin, trypsin is also secreted as inactive trypsinogen, which is activated by:**
A) Enterokinase✓
B) Chyme
C) Lipase
D) Erypsin

Q.7 **Name the nutrition resulted by feeding on dead and decaying matter.**
A) Saprophytic.✓
B) Symbiotic.
C) Parasitic.
D) Both B and C.

Q.8 **Name the neurotic disorder characterized by bouts of over eating of fattening foods.**
A) Bulimia nervosa.✓
B) Anorexia nervosa.
C) Dyspepsia.
D) Salmonella.

Q.9 **Which of the following enzyme is released in an inactive form**
A) Amylase
B) Enterokinase
C) Lipase
D) Pepsin✓

Q.10 **Which of the following hormones stimulate the secretion of pancreatic juice from pancreas in liver?**
A) Secretin✓
B) Gastrin
C) Pepsinogen
D) Both Gastrin and Secretin

Q.11 **In large intestine, vitamin k is formed by the activity of**
A) Symbiotic Bacteria✓
B) Parasitic Bacteria
C) Obligate Bacteria
D) Facultative Bacteria

Q.12 **During swallowing of food which structure close nasal opening?**
A) Hard Palate
B) Epiglottis
C) Soft Palate✓
D) Larynx

Q.13 **The muscles of the stomach walls thoroughly mix up the food with gastric juices and the resulting semi-solid / semi-liquid material is called**
A) Bolus
B) Mucus
C) Bolus or chime
D) Chyme✓

Q.14 **Trypsinogen is converted into trypsin by the activity of**

A) Goblet cells
C) Absorptive cells
B) Enterokinase✓
D) Peptidase

Q.15 **In large intestines, vitamin K is formed by the activity of**
A) Symbiotic bacteria✓
C) Obligate parasite
B) Parasitic bacteria
D) Facultative bacteria

Q.16 **Goblet cells secrete**
A) HCl
C) Mucus✓
B) Enzymes
D) Amylase

Q.17 **Which one of the following vitamins is produced by microflora of large intestine?**
A) Vitamin K✓
C) Vitamin C
B) Vitamin A
D) Vitamin D

Q.18 **_____ is activated to _____ by Enterokinase/enteropeptidase enzyme secreted by the lining of duodenum:**
A) Pepsinogen, Pepsin
C) Pepsinogen, Trypsin
B) Trypsinogen, Trypsin✓
D) Chymotrypsinogen, Chymotrypsin

Q.19 **Which of the following are absorbed in the large intestine?**
A) Water and salts✓
C) Water and peptones
B) Salts and glycerol
D) Amino acids and sugars

Q.20 **Saliva is basically composed of water, mucus, amylase and:**
A) Sodium bicarbonate✓
C) Sodium chloride
B) Sodium hydroxide
D) Hydrocarbons

Q.21 **In human, Escherichia coli is involved in the formation of**
A) Calcium
C) Vitamin D
B) Vitamin A
D) Vitamin K✓

Q.22 **The function of Goblet cells is to secrete**
A) Gastrin
C) Hydrochloric acid
B) Pepsinogen
D) Mucus✓

Q.23 **Gastric glands are composed of _____ types of cells**
A) Two
C) Three✓
B) Four
D) Five

Q.24 **HCl in gastric juice is secreted by which one of the following cells?**
A) Chief cells
C) Oxyntic cells✓
B) Mucous cells
D) Kupffer cells

Q.25 **The lymph vessel of villi is called:**
A) Epithelium
C) Afferent lymph vessel
B) Adrenals
D) Lacteal✓

Q.26 **Oxyntic cells in stomach produces:**
A) Pepsin
C) Pepsinogen
B) Gastrin
D) HCl✓

Q.27 **The hormone which inhibits the secretion of pancreatic juice is:**
A) Secretin✓
C) Gastrin
B) Thyroxine
D) Parathormone

Q.28 **Trypsinogen is activated to trypsin by:**
A) HCl
C) Enterokinase✓
B) Mucus
D) Gastrin

Q.29 **The emulsification of fats is the role of:**

A) Saliva
B) Gastrin
C) Pancreatic juice
D) Bile✓

Q.30 Digestion of _____ starts in oral cavity due to the action of enzyme present in saliva.
A) Starch✓
B) Fatty Acids
C) Cellulose
D) Polypeptides

Q.31 Food enters from stomach into small intestine through:
A) Pyloric Sphincter✓
B) Semilunar valve
C) Cardiac Sphincter
D) Diaphragm

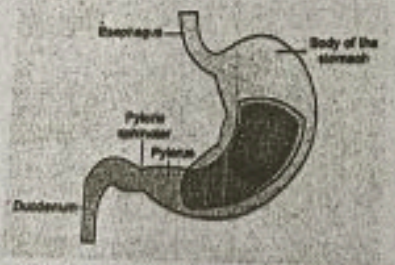
Q.32 _____ are the part of a gastric gland which produce hydrochloric acid.
A) Parietal Cells✓
B) Chief Cells
C) Goblet Cells
D) Zymogen Cells

Q.33 Protein components of food are digested by the enzymatic secretion of:
A) Goblet Cells
B) Zymogen Cells✓
C) Parietal Cells
D) Oxyntic Cells

Q.34 Digestive System consists of different layers, the innermost is known as:
A) Submucosa
B) Muscularis
C) Mucosa✓
D) Serosa

Q.35 Food is diverted in the oesophagous by:
A) Glottis
B) Cheeks
C) Tongue
D) Epiglottis✓

Q.36 Label 'a' in the following diagram:

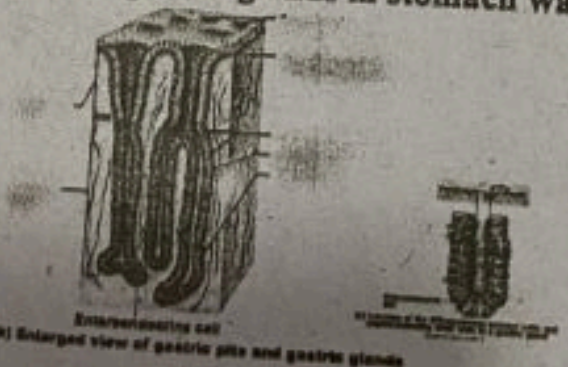


A) Cardiac sphincter
B) Stomach valve
C) Sinoatrial valve
D) Pyloric sphincter✓

Q.37 Enzyme pepsin acts on:

Options	Substrate	Products
A)	**Protein**	**Polypeptides✓**
B)	Polypeptide	Dipeptides
C)	Fats	Fatty acids/glycerol
D)	Protein	Amino Acids

Q.38 Following is the structure of gastric glands in stomach wall where 'x' is:



A) Mucosa
C) Mucus cells
B) Visceral fat cells
D) Oxyntic cells✓

Q.39 Salivary Amylase begins to digest starch to shorter polysaccharides and then to:
A) Maltose✓
C) Sucrose
B) Glucose
D) Lactose

Q.40 Number of salivary glands found in human oral cavity:
A) 4
B) 6✓
C) 2
D) 3

Gas Exchange & Transport Plants

Q.1 Which one of the following acts as functional unit of lungs in man?
A) Air sac✓
C) Larynx
B) Trachea
D) Bronchioles

Q.2 Which one of following factors is directly proportional to oxygen carrying capacity of haemoglobin?
A) Carbon dioxide
B) pH✓
C) Temperature
D) Light

Q.3 Expiration in human beings is carried out by
A) Contraction of lungs
C) Contraction of intercostal membrane
B) Relaxation of intercostal and diaphragm muscles✓
D) Contraction of diaphragm muscles

Q.4 Which one of the following is a precursor of steroid hormones?
A) Glycerol
B) Amino acids
C) Sterol
D) Cholesterol✓

Q.5 Granulocytes or white blood cells are produced in
A) Lymph nodes
B) Tonsils
C) Red bone marrow✓
D) Spleen

Q.6 Which one of the following statements best describes the function of sinoatrial node?
A) It sends out electrical impulses to atrial muscles causing both atria to contract.✓
C) It consists of small number of diffusely oriented cardiac fibres
B) It sends out electrical impulses to ventricular muscles causing both ventricles to contract
D) It is present at upper end of left atrium.

Q.7 The flow of lymph in lymphatic vessels is maintained by:
A) Heart, activity of smooth muscles and valves
C) Activity of skeletal muscles, heart and breathing movements
B) Breathing movements, activity of skeletal muscles and valves✓
D) Exercise, breathing movements and heart

Q.8 Which of the following proteins is common in man and aerobic bacteria?
A) Haemoglobin
B) Cytochrome c✓
C) Myoglobin
D) Pilin

Q.9 Which of the following statement best describes the function of sinoatrial node?
A) It sends out electrical impulses to ventricles to contract.

C) It is present at upper end of the left atrium
B) It consists of small number of diffusely oriented cardiac fibers.
D) It sends out electrical impulses to atrial muscles causing both atria to contract.✓

Q.10 Arteriosclerosis is:
A) A metabolic disorder
B) An infectious disorder
C) A degenerative Disorder✓
D) A nutritional deficiency disorder

Q.11 The respiratory pigment, which has much higher affinity to combine with oxygen, is:
A) Myoglobin✓
B) Haemoglobin
C) Globin
D) Hemocyanin

Q.12 Most of the carbon dioxide is carried in the blood in the form of:
A) Bicarbonate✓
B) CO2
C) Carboxyhemoglobin
D) Blood plasma protein

Q.13 End product of hemoglobin break down is:
A) Creatinine.
B) Hypoxanthin.
C) Bilirubin.✓
D) Xanthin.

Q.14 When carbon dioxide pressure increases the capacity of haemoglobin to hold oxygen:
A) Increases many folds.
B) Remains constant.
C) Decreases.✓
D) Is doubled.

Q.15 The total inside capacity of lungs of adult human beings when fully inflated is
A) 5 ml.✓
B) 500 ml.
C) 50 ml.
D) 5000 ml.

Q.16 The attraction among water molecules which hold water together is called
A) Tension.
B) Cohesion.✓
C) Adhesion.
D) Ambibition.

Q.17 The right atrium of the heart usually receives the
A) Deoxygenated Blood✓
B) Filtered Blood
C) Oxygenated Blood
D) Non-Filtered Blood

Q.18 The largest lymph duct called thoracic lymph duct drains into
A) Subclavian Vein✓
B) Pulmonary Vein
C) Renal Vein
D) Hepatic Portal Vein

Q.19 Which protein plays a major role in maintaining osmotic balance?
A) Albumin✓
B) Fibrinogen
C) Globulin
D) Prothrombin

Q.20 The type of agranulocytes which stays in blood for a few hours and then enters tissues and become macrophages are
A) Lymphocytes
B) Eosinophils
C) Monocyte✓
D) Basophils

Q.21 Mature mammalian red blood cells do not have
A) Nucleus✓
B) Fluids
C) Red color
D) Haemoglobin

Q.22 In a normal person plasma constitutes about _____ by volume of blood
A) 50%
B) 45%
C) 60%
D) 55%✓

Q.23 Which vein has oxygenated blood?
A) Renal vein
C) Pulmonary vein

C) Subclavian vein✓ D) Jugular vein

Q.24 What is the residual volume of air which always remains inside the lungs of human?
A) 3.5 Liters B) 5.0 Liters
C) 0.5 Liters D) 1.5 Liters✓

Q.25 The total inside capacity of lungs is _____ for man.
A) 6.7 liters B) 7 liters
C) 2.5 liters D) 5 liters✓

Q.26 The average life span of red blood cell is about:
A) Four months✓ B) Five months
C) Two months D) One month

Q.27 The lymphatic vessels of the body empty the lymph into blood stream at the:
A) Abdominal vein B) Jugular vein
C) Subclavian vein✓ D) Bile duct

Q.28 Right atrium is separated from right ventricle by:
A) Tricuspid valve✓ B) Semilunar valve
C) Bicuspid valve D) Septum

Q.29 Histamine is produced by which one of the following cells?
A) Basophils✓ B) Monocyte
C) Platelets D) Eosinophils

Q.30 Which one of the following is the most numerous / commonest of white blood cells?
A) Eosinophils B) Neutrophils
C) Monocytes D) Lymphocytes✓

Q.31 The oxygenated blood from lungs to heart is transported by the
A) Pulmonary artery B) Pulmonary vein✓
C) Coronary artery D) Hepatic artery

Q.32 Which one of the following proteins takes part in blood clotting?
A) Prothrombin B) Immunoglobulin
C) Fibrinogen✓ D) Globulin

Q.33 Right atrium is separated from right ventricle by:
A) Bicuspid Valve B) Tricuspid Valve✓
C) Semilunar Valve D) Interatrial Septum

Q.34 The flaps of tricuspid valves are attached to muscular extensions of right ventricle known as:
A) Smooth Muscles B) Intercostal Muscles
C) Papillary Muscles✓ D) Skeletal Muscles

Q.35 One complete heart beat consists of one systole and one diastole and lasts for about:
A) 0.8 sec✓ B) 0.4 sec
C) 0.2 sec D) 0.5 sec

Q.36 The heart beat cycle starts when electric impulses are generated from;
A) AV Node B) SA Node✓
C) SV Node D) PQ Node

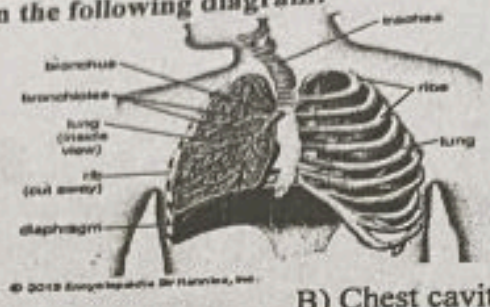
Q.37 About 70-85% CO_2 in blood is carried:
A) As carboxylase myoglobin B) Freely as CO_2
C) With proteins in plasma D) As bicarbonate✓

Q.38 In human the closed sac which surrounds the heart is:
A) Endocardium B) Pericardium✓

C) Myocardium
D) Epicardium

Q.39 Chordae tendinea are fibrous cords attached with:
A) Cardiac end of stomach valve
B) Pyloric sphincter of stomach
C) Tricuspid valve of heart✓
D) Eyelid

Q.40 Label the part 'Y' in the following diagram:



A) Pleura
B) Chest cavity
C) Diaphragm✓
D) Intercoastal muscles

Muscles & Movement / Excretion & Osmoregulation

Q.1 Metabolic waste from metabolism of nucleic acid is
A) Uric acid✓
B) Urea
C) Creatine
D) Creatinine

Q.2 The central metabolic station and clearing house of a body is
A) Liver✓
B) Nephron
C) Kidney
D) Glomerulus

Q.3 A central cavity of the kidney where urine is collected after filtration is known as:
A) Ureter
B) Urethra
C) Pelvis✓
D) Urinary Bladder

Q.4 Aldosterone plays role in:
A) Transport of water
B) Uptake of sodium in loop of Henle✓
C) Transport of K^+ ions into kidney
D) Reabsorption of water

Q.5 Technique used for non-surgical removal of kidney stone is called:
A) Ultrasound
B) Dialysis
C) Lithotripsy✓
D) X-ray

Q.6 _____ did not have the adaptations to remove the flooding of their cells in fr water.
A) Both B, D.
B) None of B, D.
C) Hydrophytes.✓
D) Xerophytes.

Q.7 How much water approximately is required to excrete 1 kg of ammonia nitrogen?
A) 500 ml.
B) 300 litre.
C) 5 litre.
D) 500 litre.✓

Q.8 How many grams of nitrogen can be eliminated in form of uric acid by 50 m water?
A) 20.
B) 30.

C) 25. D) 50.✓

Q.9 **Which one of these is an example of tubular excretory system called metanephridia?**
A) Planaria. B) Cockroach.
C) Hydra. **D) Earthworm.✓**

Q.10 **Reabsorption of water by counter current multiplier mechanism takes place at**
A) Proximal Tubule B) Collecting Duct
C) Distal Tubule **D) Loop of Henle✓**

Q.11 **Antiduretic hormone helps in reabsorption of water by changing permeability of**
A) Proximal Tubule **B) Collecting Duct✓**
C) Distal Tubule D) Loop of Henle

Q.12 **During peritoneal dialysis, dialysis fluid is introduced into which part of human body?**
A) Liver B) Kidney
C) Abdomen✓ D) Pancreas

Q.13 **Aldosterone helps in conservation or active absorption of**
A) Sodium✓ B) Potassium
C) Calcium D) Bicarbonate Ions

Q.14 **Maximum reabsorption takes place in which part of the nephron?**
A) Distal Tubule B) Cortical Tissue
C) Villi **D) Proximal Tubule✓**

Q.15 **In nephron, most of the reabsorption takes place in the**
A) Distal tubule B) Ascending limb
C) Proximal tubule✓ D) Descending limb

Q.16 **Detection of change and signaling for effector's response to the control system is a**
A) Negative feedback B) Inter-coordination
C) Positive feedback **D) Feedback mechanism✓**

Q.17 **What are three components of mechanism of homeostatic regulations?**
A) Receptors, control centre and effectors✓
C) Sensory, motor and associative neurons
B) CNS, PNS and diffused nervous system
D) Cerebrum, cerebellum and pons

Q.18 **Blood enters the glomerulus through**
A) Efferent arteriole B) Renal artery
C) Afferent arteriole✓ D) Renal vein

Q.19 **Which portion of nephron is under the control of ADH?**
A) Bowman's capsule **B) Distal and collecting ducts✓**
C) Ascending arm D) Descending arm

Q.20 **Site of filtration in nephron is:**
A) Glomerulus and Bowman's capsule✓
C) Proximal and Distal end
B) Ascending and descending arm
D) Loop of Henle

Q.21 **Antidiuretic hormone increases the reabsorption of:**
A) Amino acids B) Ammonia
C) Salts **D) Water✓**

Q.22 **Active uptake of_____ in the ascending limb or thick loop of Henle is promoted by**

the action of aldosterone:
A) K^+ B) Ca^{++}
C) Cl^- **D) Na^+✓**

Q.23 The process through which the body maintains the internal environment from the fluctuations of external environment is called as:
A) Behavior of organisms B) Thermoregulation
C) Adaptation **D) Homeostasis✓**

Q.24 Active pumping out of Na^+ occurs at which part of nephron:
A) Proximal tubule **B) Ascending loop of Henle✓**
C) Descending loop of Henle D) Collecting ducts

Q.25 Which one of the following is responsible for the production of concentrated urine?
A) Juxtamedullary nephrons✓ B) Proximal tubule
C) Cortical nephrons D) Distal tubule

Q.26 Reabsorption of useful constituents normally takes place in which one of the following?
A) Proximal tubule✓ B) Bowman's capsule
C) Distal tubule D) Glomerulus

Q.27 Which one of the following parts of excretory system in humans acts as countercurrent multiplier?
A) Kidney B) Medulla
C) Cortex **D) Loop of Henle✓**

Q.28 Anti-Diuretic Hormone (ADH) is released from
A) Anterior pituitary lobe B) Hypothalamus
C) Posterior pituitary lobe✓ D) Thalamus

Q.29 Which one of the following is the main nitrogenous waste product in humans?
A) Urea✓ B) Salts
C) Ammonia D) Uric acid

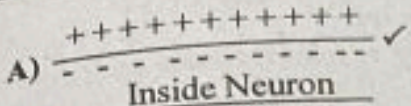
Q.30 Those nephrons which are present along the border of the cortex and medulla are called:
A) Juxtamedullary nephrons✓ B) Internal nephrons
C) Cortical nephrons D) Outer nephrons

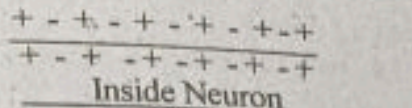
Nervous System

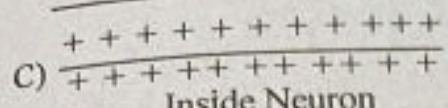
Q.1 Reflexes and instincts type of behaviours respond to which combination /s?
A) Biological rhythms, territorial, courtship and development
C) The responses that do produce same result in different conditions
B) Aggression, mating and altruism✓
D) The responses that are predetermined like differentiation.

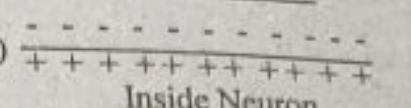
Q.2 A typical neuron at rest
A) Is more positive outside than inside✓
C) Is more negative outside than inside
B) Has no charge on either side
D) has an equal charge on either side

Q.3 Which one of the following conditions best describes active membrane potential:

A) 

B) 

C) 

D) 

Q.4 Which of the following neurotransmitters lies outside the central nervous system?
A) Serotonin
B) Acetylcholine✓
C) Dopamine
D) Adrenaline

Q.5 Which hormonal pair shares a common hypothalamic releasing factor?
A) STH and LH
B) FSH and STH
C) ACTH and LH
D) FSH and LH✓

Q.6 Which of the following receptors produce sensation of pain?
A) Mechanoreceptor.
B) Chemoreceptors.
C) Nociceptors.✓
D) Thermoreceptors.

Q.7 When your finger accidentally gets caught in a door, the pain message is sent to your brain through _____.
A) Homeostasis.
B) Caffeine.
C) Sensory receptors.✓
D) The medulla.

Q.8 It controls the several automatic functions like breathing, heart rate and blood pressure:
A) Midbrain.
B) Medulla.✓
C) Pons.
D) Cerebellum.

Q.9 This disease is characterized by the decline in brain function.
A) Alzheimer's disease.✓
B) Epilepsy.
C) Parkinson's disease.
D) None of these.

Q.10 Over-activity of sympathetic nervous system causes
A) Disturbance of Vision
B) Decrease in Blood Pressure
C) Constipation
D) Increase in Heart Rate✓

Q.11 Which structures respond when they are stimulated by impulse coming through motor neuron?
A) Receptors
B) Effectors✓
C) Responses
D) Transduction

Q.12 Respiratory center is located in
A) Cerebrum
B) Medulla✓
C) Cerebellum
D) Hypothalamus

Q.13 A neurological condition characterized by involuntary tremors, diminished motor activity and rigidity is called
A) Epilepsy
B) Alzheimer's Disease
C) Parkinson's Disease✓
D) Cerebullar Tumours

Q.14 The part of neuron fibre which conducts nerve impulses from the cell body is
A) Dendron
B) Axon✓
C) Dendrites
D) Peripheral branch

Q.15 The number of cranial nerves in human is
A) 31 pairs
B) 24 pairs

C) 12 pairs✓ D) 62 pairs

Q.16 The part of brain which controls breathing, heart rate and swallowing is
A) Cerebrum **B) Medulla✓**
C) Cerebellum D) Hypothalamus

Q.17 Cause of Parkinson's disease is death of brain cells that produce
A) Dopamine✓ B) ADH hormone
C) Acetylcholine D) Oxytocin

Q.18 The structures which respond when they are stimulated by impulse coming through motor neuron are:
A) Receptors B) Transducers
C) Responders **D) Effectors✓**

Q.19 Thalamus and cerebrum are the part of:
A) Fore brain✓ B) Hind brain
C) Mid brain D) Spinal cord

Q.20 There is also EVIDENCE that high levels of _____ may contribute to the onset of Alzheimer's disease:
A) Mg **B) Al✓**
C) Mo D) Ca

Q.21 L-dopa or Levodopa is used to get some relief from??
A) Epilepsy **B) Parkinson's disease✓**
C) Alzheimer's disease D) Dementia

Q.22 The right and left cerebral hemispheres are connected by a thick band of nerve fibres called:
A) Medulla B) Pons
C) Corpus callosum✓ D) Hippocampus

Q.23 The part of the brain which guides smooth and accurate motions and maintains body position is called
A) Cerebrum B) Pons
C) Cerebellum✓ D) Medulla

Q.24 Which one of the following is the effect of sympathetic nervous system?
A) Constriction of bronchi B) Promotes digestion or peristalsis
C) Decrease in heart rate **D) Dilates the pupil✓**

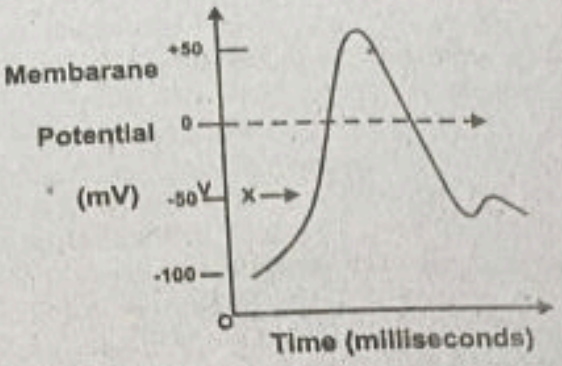
Q.25 High levels of aluminium may contribute to the onset of which one of the following?
A) Parkinson's disease **B) Alzheimer's disease✓**
C) Epilepsy D) Gonorrhea

Q.26 Which disease is responsible for dementia (memory loss)?
A) Parkinson's Disease B) Epilepsy
C) Alzheimer's Disease✓ D) Grave's Disease

Q.27 Neurotransmitter secreted at synapse outside the central nervous system is:
A) Dopamine B) Androgen
C) Polypeptide **D) Acetylcholine✓**

Q.28 Conduction of action potentials from one mode of Ranvier to another in myelinated neurons is through:
A) Hyperpolarization B) Depolarization
C) Resting Membrane Potential **D) Saltatory Conduction✓**

Q.29 In the following diagram of action potential in a neuron, 'x' depicts:



A) Depolarization✓ B) Repolarization
C) Polarization D) Hyperpolarization

Q.30 Random, uncontrolled activity of some cells in the brain leading to chaotic activity in both sensory and motor nerves causes patients of to see and hear different strange things.
A) Epilepsy✓ B) Alzheimer's Disease
C) Parkinson's Disease D) Huntington's Disease

Q.31 Part of hind brain responsible for the balance and equilibrium of body is called:
A) Medulla B) Pons
C) Cerebellum✓ D) Thalamus

Q.32 The disease in which death of small number of cells in the basal ganglia leads to inability to select and initiate patterns of movement is known as:
A) Fever B) Epilepsy
C) Alzheimer's Disease D) Parkinson's Disease✓

Q.33 A neurological disorder characterized by the decline in brain function is _____. Its symptoms are similar to those diseases that cause dementia.
A) Parkinson's Disease B) Alzheimer's Disease✓
C) Epilepsy D) Diabetes

Q.34 A discharge by brain which causes chaotic activity in motor and sensory areas is:
A) Meningitis B) Epilepsy✓
C) Alzheimer's Disease D) Parkinson's Disease

Q.35 The nerve impulse which jumps from node to node in myelinated neurons is called as:
A) Resting membrane potential B) Threshold stimulus
C) Saltatory nerve impulse✓ D) Initial nerve impulse

Support & Movement

Q.1 The muscles that control urine in bladder are known as
A) Striated muscles B) Sphincter muscles✓
C) Smooth muscles D) Circular muscles

Q.2 The living cells of cartilage are called
A) Chrondrocytes✓ B) Ostecytes

C) Osteoblasts D) Osteoclasts

Q.3 The disease which causes immobility and fusion of vertebral joints is
A) Osteomalacia (soft bones) B) Arthritis
C) Disc slip **D) Spondylosis✓**

Q.4 During muscle contraction
A) I-band shortens B) Actin filaments shorten
C) Myosin filaments shorten D) Z-line disappears

Q.5 The joints that allow movements in several directions are:
A) Hinge Joints B) Fibrous Joints
C) Ball and Socket Joints✓ D) Cartilaginous Joints

Q.6 The collagen fibers of bone are hardened by deposit of:
A) Calcium phosphate✓ B) Calcium carbonate
C) Calcium oxalate. D) Calcium bicarbonate

Q.7 Neck has _____ type of joint.
A) Ball and socket. B) Hinge.
C) Pivot.✓ D) Fibrous.

Q.8 Which of the following belong to collenchyma cells?
A) Fibers. B) Sclereides.
C) Vessels. **D) None of these.✓**

Q.9 Name the external factor of growth in plants
A) Carbon dioxide.✓ B) Hormones.
C) Water. D) Nutrition.

Q.10 Pick the paratonic movement from the following
A) Nastic.✓ B) Growth.
C) Turgor. D) Tactic.

Q.11 Which of the following is made up of bones and cartilage?
A) Endoskeleton.✓ B) Hydrostatic skeleton.
C) Exoskeleton. D) Both A and B.

Q.12 Which disease causes immobility and fusion of vertebral joint?
A) Sciatica. B) Disc slip.
C) Spondylosis. **D) Rickets.✓**

Q.13 Which disease is caused by low calcium in the blood?
A) Tetany.✓ B) Muscle fatigue.
C) Cramp. D) Sciatica.

Q.14 Muscle is made up of many cells which are referred to as
A) Myofilaments B) Sarcolemma
C) Myofibrils **D) Muscles Fiber✓**

Q.15 The length of myofibril from one Z-band to the next is known as
A) Sarcomere✓ B) Sarcoplasm
C) Sarcolemma D) Muscle Fiber

Q.16 Calcium ions released during a muscle fiber contraction attach with
A) Myosin B) Tropomyosin
C) Actin **D) Troponin✓**

Q.17 A muscle condition resulting from the accumulation of lactic acid and ionic imbalance is:
A) Tetany B) Cramp

C) Muscle Fatigue✓ D) Tetanus

Q.18 The pigment which stores oxygen in muscles is
A) Hemoglobin B) Myosin
C) Myoglobin✓ D) Actinomyosin

Q.19 Each muscle fibre is surrounded by membrane which is called
A) Sarcomere B) Twitch fibre
C) Sarcolemma✓ D) Capsule

Q.20 When calcium ions are released from the sarcoplasmic reticulum they bind with _____ during muscle contraction
A) Tropomyosin B) Cytosol's ions
C) Sarcolemma D) Troponin✓

Q.21 Human and mammalian skeleton can be divided into two parts, axial skeleton and
A) Appendicular skeleton✓ B) Endoskeleton
C) Exoskeleton D) Hydrostatic skeleton

Q.22 Last four vertebrae in humans are fused to form a structure called
A) Sacrum B) Pubis
C) Cervical vertebrae D) Coccyx✓

Q.23 How many bones are involved in the formation of each half of pelvic girdle?
A) 3 bones✓ B) 2 bones
C) 4 bones D) 1 bone

Q.24 The length of myofibril from one Z-band to the next is described as:
A) Sarcolemma B) Sarcomere✓
C) Sarcoplasm D) Muscle fiber

Q.25 The Ca^{++} ions released during a muscle fiber contraction attach with:
A) Myosin B) Troponin✓
C) Actin D) Tropomyosin

Q.26 The joint that allows the movement in several directions is called:
A) Hinge joint B) Cartilagous joint
C) Ball and Socket joint✓ D) Fibrous joint

Q.27 Where can we find H zone in the figure of fine structure of skeletal muscle's myofibril?
A) In the mid of A band✓ B) Besides the Z-line
C) In I-band D) Along the I-band

Q.28 First vertebra of cervical region of vertebral column is known as:
A) Atlas✓ B) Thoracic
C) Sacral D) Axis

Q.29 In a human vertebral column, the number of _____ vertebrae is 7.
A) Cervical✓ B) Lumber
C) Thoracic D) Sacrum

Q.30 Which one of the following structures holds the bones together?
A) Joints B) Fibrous capsules
C) Cartilages D) Ligaments✓

Q.31 Which one of the following cartilages is the most abundant in the human body?
A) Elastic cartilage B) Fibrous Cartilage
C) Chondrous cartilage D) Hyaline Cartilage✓

Q.32 The repeated protein pattern of myofibrils is called
A) Sarcomere✓ B) Sarcolemma
C) Zyomere D) Cross bridges

Q.33 When more energy is required in muscle contraction then that energy can also be produced by _____ as a secondary source.
A) Glucose B) Fructose
C) Phosphocreatine✓ D) Lactic acid

Q.34 The total number of cervical and thoracic vertebrate in human vertebral column is:
A) 7 B) 14
C) 19✓ D) 33

Q.35 A sarcomere is the region of a myofibril between two successive:
A) M-lines B) I-bands
C) Z-lines✓ D) T-tubules

Hormonal Control

Q.1 Hormones are the organic compounds of varying structural complexity. Which of the following is not a function or property of these compounds?
A) They initiate new biochemical reactions✓
B) They are poured directly into blood
C) They may be proteins D) They affect target cells

Q.2 Which of the following will happen if fertilization does not occur?
A) Menopause starts B) FSH secretion is increased
C) Corpus luteum degenerates✓ D) Progesterone secretion is increased

Q.3 Which of the following promotes both leaf and fruit growths?
A) Auxins. B) Abscisic acid.
C) Gibberellins.✓ D) Ethane.

Q.4 Which hormone continues to promote protein synthesis throughout the body even after the cease in growth?
A) TSH. B) ACTH.
C) ADH. **D) STH.✓**

Q.5 Neurosecretory cells are present in which part of brain
A) Hypothalamus✓ B) Pons
C) Midbrain D) Cerebellum

Q.6 Which of the following is the function of glucagon hormone?
A) Glycogen to Glucose✓ B) Glucose to Lipids
C) Glucose to Glycogen D) Glucose to Proteins

Q.7 Addison's disease is caused due to destruction of
A) Adrenal Cortex✓ B) Adrenal Medulla
C) Pituitary Adrenal Axis D) Hypothalamus

Q.8 Which group of hormones is made up of amino acids and their derivatives?
A) Vasopressin and ADH B) Osterogen and Testosterone
C) Epinephrine and Non-Epinephrine✓ D) Insulin and Glucagon

Q.9 Ductless glands are known as
A) Endocrine gland✓ B) Salivary glands

C) Exocrine gland D) Bile glands

Q.10 **Gastrin is the hormone which is produced by the**
A) Liver C) Pyloric region of stomach
B) Adrenal gland✓ D) Mucosal lining of intestine

Q.11 **β-cells of liver secrete a hormone that is called**
A) Insulin B) Antidiuretic hormone
C) Glucagon D) Gastrin

Q.12 **Vasopressin and Oxytocin are released from the**
A) Placenta B) Anterior pituitary
C) Ovary **D) Posterior pituitary✓**

Q.13 **Chemically insulin and glucagon are:**
A) Carbohydrates B) Lipids
C) Proteins✓ D) Nucleic acids

Q.14 **Hormones secreted by anterior pituitary and which controls the secretion of hormones of other endocrine glands are known as:**
A) Release factor B) Accelerator
C) Inhibitor **D) Tropic or trophic hormones✓**

Q.15 **Alpha cells of Islets of Langerhans secrete hormone called:**
A) Glucocorticoid **B) Glucagon✓**
C) Insulin D) Aldosterone

Q.16 **Which of the following is the function of glucagon hormone?**
A) Glucose to lipids B) Glucose to glycogen
C) Glucose to proteins **D) Glycogen to glucose✓**

Q.17 **Which one of the following is a steroid hormone?**
A) Glucagon B) Epinephrine
C) Thyroxine **D) Oestrogen✓**

Q.18 **The gonadotrophic hormones of anterior lobe of pituitary include:**
A) Prolactin, Thyroid Stimulating Hormone, Somatotropin Hormone
C) Follicle Stimulating Hormone, Luteinizing Hormone, Prolactin✓
B) Adrenocorticotrophic Hormone, Luteinizing Hormone, Follicle Stimulating Hormone
D) Luteinizing Hormone, Follicle Stimulating Hormone, Thyroid Stimulating Hormone

Q.19 **Over-activity of cortical hormone of adrenal gland causes**
A) Addison's disease **B) Cushing's disease✓**
C) Parkinson's disease D) Down's syndrome

Q.20 **How many iodine atoms are present in thyroxine?**
A) 3✓ B) 2
C) 4 D) 5

Q.21 **Thyroxine deficiency in adults' results in a condition called:**
A) Cretinism B) Thyrotoxima
C) Hypothyroidism **D) Myxoedema✓**

Q.22 **α-cells of pancreas secrete a hormone known as:**
A) Glucagon✓ B) Gastrin
C) Insulin D) Rennin

Q.23 **Over-secretion of cortical hormone causes a disease called;**
A) Cushing's Disease✓ B) Hypoglycemia
C) Diabetes Mellitus D) Addison's Disease

Q.24 Ejection of milk from mammary glands is under the control of which one of the following horniones?
A) Androgen B) Progesterone
C) Oxytocin✓ D) Estrogen

Q.25 _____ hormone is antagonistic to insulin and causes increase in blood glucose level.
A) Glucagon✓ B) Calcitonin
C) Nor-epinephrine D) Thyroxine

Q.26 Beta cells of islets of Langerhans produce _____ hormone.
A) Glucagon B) Pancreatic Juice
C) Insulin✓ D) Parathormone

Q.27 The central portion of adrenal gland (Adrenal Medulla) produces _____ hormone.
A) Aldosterone B) Androgen
C) Epinephrine✓ D) Corticosterone

Q.28 _____ hormones are called fight and flight hormones as they prepare an organism to face stressful situation.
A) Adrenaline, Aldosterone B) Cortisone, Oxytocin
C) Epinephrine, Nor-epinephrine✓ D) Thyroxine, Nor-epinephrine

Q.29 The thyroxine hormones of thyroid glands act directly on:
A) Iodine metabolism B) Glucose metabolism
C) Protein metabolism **D) Basal metabolic rate✓**

Q.30 All the hormones released by anterior pituitary are tropic hormones except:
A) TSH B) ACTH
C) STH✓ D) Gonadotrophin hormone

Immunity

Q.1 Tissue rejection is executed by:
A) Both B and T lymphocytes B) B-lymphocytes
C) Monocytes **D) T-lymphocytes✓**

Q.2 Antibiotics act against:
A) Bacterial Diseases✓ B) Bacterial and Viral Diseases
C) Allergies D) Viral Diseases

Q.3 Antibiotics are actually:
A) Globular proteins✓ B) Fibrous proteins
C) Glycoproteins D) Glycolipids

Q.4 Heparin prevents blood clots and is released by:
A) Eosinophils B) Neutrophils
C) Monocytes **D) Basophils✓**

Q.5 Thymus gland is involved in maturation of
A) Platelets B) Eosinophils
C) B-Lymphocytes **D) T-Lymphocytes✓**

Q.6 In passive immunity which of the following component are injected into blood

A) Antigens
B) Serum
C) Immunogens
D) Immunoglobulins✓

Q.7 Mucous membranes are part of body defense system and they offer
A) Physical Barriers✓
B) Chemical Barriers
C) Mechanical Barriers
D) Biological Barriers

Q.8 Immediate protection is obtained from
A) Passive Immunity✓
B) Vaccination
C) Active Immunity
D) Natural Activity Immunity

Q.9 The immunity in which T-cells recognize the antigens or micro-organisms is known as
A) Tissue Grafting
B) Cell Mediated Immunity / Response✓
C) Phagocytosis
D) Hormonal Immunity / Response

Q.10 Antigen is a foreign protein or any other molecule which stimulates the formation of
A) MHC complex
B) Mucus
C) Immunogen
D) Antibodies✓

Q.11 Antibodies are produced by which of the following lymphocytes?
A) B lymphocytes✓
B) T lymphocytes
C) A lymphocytes
D) B and T lymphocytes

Q.12 T-lymphocytes become mature and competent under the influence of
A) Liver
B) Thymus gland✓
C) Bursa of fabricius
D) Spleen

Q.13 Skin and mucous membranes are part of the body defense system and they form the
A) Physical barrier✓
B) Chemical barriers
C) Mechanical barriers
D) Biological barriers

Q.14 Snake bite is treated with which type of immunization?
A) Active
B) Humoral
C) Passive✓
D) Specific

Q.15 In passive immunity which of the following components are injected into body?
A) Antigens
B) Serum
C) Immunogens
D) Immunoglobulins✓

Q.16 Which part of the antibody recognizes the antigen during immune response?
A) Heavy part
B) Light part
C) Variable part✓
D) Consonant part

Q.17 Two identical light chains and two identical heavy chains in antibody molecule are linked by:
A) Disulphide bridges✓
B) Glycerol bond
C) Peptide bond
D) Ionic bond

Q.18 Antibodies are produced against invading cells by:
A) Lymphocytes✓
B) Basophils
C) Basophils
D) Neutrophils

Q.19 In the structural diagram of an antibody molecule which portion is occupied by variable chains?
A) Lower region
B) Middle region
C) Upper region✓
D) In between chains

Q.20 T-lymphocytes recognize antigen and attack microorganisms or transplanted organ and tissues. This effect is called

A) Cell-mediated response
B) Active immunity
C) Humeral immune response✓
D) Passive immunity

Q.21 Which part of antibody recognizes the antigen during immune response?
A) Heavy part
B) Constant part
C) Light part
D) Variable part✓

Q.22 What type of immunity is achieved by injecting antibodies, antiserum, anti-venom serum?
A) Active immunity
B) Artificially induced immunity
C) Passive immunity✓
D) Naturally induced immunity

Q.23 Which one of the following glands is involved in the production of lymphocytes?
A) Pineal
B) Thymus✓
C) Pituitary
D) Adrenal

Q.24 Antibodies are proteins and made up of how many polypeptide chains?
A) One
B) Three
C) Two
D) Four✓

Q.25 In _____ response, β-cells produce plasma cells that synthesize antibodies and release in blood plasma and tissue fluid.
A) Cell-Mediated
B) Humoral✓
C) Hormonal
D) Phototactic

Q.26 Passive immunity is used against:
A) Malaria
B) Dengue
C) Typhoid
D) Tetanus✓

Q.27 B-lymphocytes are named due to their relationship with:
A) Blood
B) Bone Marrow
C) Bursa of Fabricius✓
D) Bile Duct

Q.28 Granulocytes are:
A) Monocytes, Eosinophils, Basophils
B) Neurophils, Eosinophils, Basophils✓
C) Basophils, Macrophages, Neurophils
D) Monocytes, Macrophages, Basophils

Q.29 Response of body against the transplanted organ is:
A) Homeostatic Response
B) Primary Response
C) Behavioral Response
D) Cell-mediated Response✓

Q.30 B-cells release antibodies in blood plasma, tissue fluid and lymph. This kind of immune response is called:
A) Cell Mediated Response
B) Active Response
C) Humoral Response✓
D) Compound Response

Bioenergetics

Q.1 Type of respiration which involves step by step breakdown of carbon chain molecules in the cell is called:
A) External respiration
B) Pulmonary respiration
C) Cellular respiration
D) Cutaneous respiration✓

Q.2 Instrument which is used to measure relative abilities of different pigments to absorb different wavelengths of light is called:
A) Spectrometer
B) Barometer

C) Photometer✓ D) Spectrophotometer

Q.3 **End products of yeast fermentation, bacterial fermentation and anaerobic respiration are**
A) Citric acid, lactic acid, carbon dioxide and water
C) Ethyl alcohol, citric acid and carbon dioxide
B) Ethyl alcohol, lactic acid, carbon dioxide and water✓
D) Methanol, lactic acid and citric acid

Q.4 **Krebs Cycle in mitochondria takes place in:**
A) Cytosol B) Outer Membrane
C) Matrix✓ D) Inner Membrane

Q.5 **Which of the following molecules is reduced by accepting hydrogen in Calvin Cycle?**
A) Glyceraldehyde-3-phosphate B) 3-Phosphoglycerate
C) Ribulose bisphosphate **D) 1,3-Bisphosphoglycerate✓**

Q.6 **The molecule formed after first phosphorylation during glycolysis is:**
A) Fructose-6-phosphate B) Glucose-1-phosphate
C) Fructose-1, 6-bisphosphate **D) Glucose-6-phosphate✓**

Q.7 **In what stage of aerobic respiration are 2-carbon molecules oxidized completely to carbon dioxide?**
A) Glycolysis. **B) Krebs cycle.✓**
C) ETC. D) Calvin cycle.

Q.8 **Chlorophylls absorb mainly _____ wave length.**
A) Yellow. **B) Violet-blue.✓**
C) Green. D) Indigo.

Q.9 **Which form of anaerobic respiration occurs in muscle cell of humans and other animals during extreme physical activities?**
A) Alcoholic fermentation **C) Lactic acid fermentation.✓**
B) Lactic acid fermentation D) Pyruvic acid oxidation.

Q.10 **Oxidative phosphorylation, synthesis of ATP in the presence of oxygen occurs in:**
A) All Types of Cells **B) All Primitive Cells✓**
C) All Anaerobic Cells D) All Aerobic Cells

Q.11 **Glycolysis is the breakdown of glucose into two molecules of**
A) Glycerate **B) Pyruvate✓**
C) Lactic Acid D) Succinic Acid

Q.12 **Before entering Krebs's cycle, the pyruvate is first decarboxylated and oxidized into**
A) Alpha Ketoglutaric Acid B) Glyceric Acid
C) Citric Acid **D) Acetic Acid✓**

Q.13 **Some electron from the second primary acceptor may pass back to chlorophyll molecules by electron carrier system, yielding ATP. This process is called**
A) Phosphorylation B) Non-Cyclic Phosphorylation
C) Photophosphorylation **D) Cyclic Phosphorylation✓**

Q.14 **Z-scheme is used for**
A) Non-Cyclic Photophosphorylation✓
C) Cyclic Photophosphorylation
B) Both Cyclic and Non-Cyclic Photophosphorylation
D) Oxidative Phosphorylation

Q.15 The product(s) of cyclic photophosphorylation is / are:
A) ATP✓ B) NADP and ATP
C) NADP D) NADP, ATP, and O_2

Q.16 Total NADH formed by one glucose molecule during Krebs's Cycle are
A) 6✓ B) 8
C) 3 D) 18

Q.17 The terminal electron acceptor in electron transport chain is
A) Hydrogen B) Cytochrome
C) Iron **D) Oxygen✓**

Q.18 The end product of glycolysis is
A) ADP B) Citric acid
C) Reduced FAD **D) Pyruvate✓**

Q.19 One molecule of FADH2 is produced in Krebs's cycle during conversion of
A) Fumarate Malate B) Malate Oxaloacetate
C) Succinate Fumarate✓ D) α-Ketoglutarate Succinate

Q.20 Every molecule of NADH, fed into ETC produces:
A) 2 ATP B) 4 ATP
C) 3 ATP✓ D) 6 ATP

Q.21 Final acceptor of electrons in respiratory chain is:
A) Cytochrome a B) Cytochrome a^3
C) Oxygen✓ D) Cytochrome c

Q.22 The end product of anaerobic respiration in humans and other mammals is:
A) Pyruvic acid **B) Lactic acid✓**
C) Ethanol D) Glucose

Q.23 A biochemical process which occurs within a cell to breakdown complex compounds to produce energy is called:
A) Respiration **B) Oxidation reduction✓**
C) Photosynthesis D) Photophosphorylation

Q.24 Which part of chlorophyll molecule absorbs light?
A) Phytol B) Pyrrole
C) Porphyrin ring✓ D) Thylakoid membrane

Q.25 Oxidative phase of glycolysis starts with dehydrogenation of
A) Glycolysis **B) Glyceraldehyde 3-phosphate✓**
C) Ribulose Bisphosphate D) NADH

Q.26 In one turn, the Krebs's cycle produces one molecule of ATP, one molecule of $FADH_2$ and _____ molecules of NADH
A) 1 **B) 3✓**
C) 2 D) 4

Q.27 Which one of the following is the stage of cellular respiration for which oxygen is not essential?
A) Glycolysis✓ B) Krebs's cycle
C) Pyruvate oxidation D) Electron Transport Chain

Q.28 Pyruvate, the end product of glycolysis moves from cytosol to mitochondrial matrix where it is oxidized into _____ producing CO_2 as a by-product.
A) Acetic acid (active) ✓ B) NAD
C) Citrate D) FAD

Q.29 Pyruvate ⟶ Acetyl CoA
A) $FAD^+ \rightarrow FADH$
B) $NADH \rightarrow NAD + H^+$
C) $NAD^+ \rightarrow NADH$✓
D) $FADH^+ \rightarrow FAD + H^+$

Q.30 **In light independent stage of _____ form an unstable 6-carbon intermediate. with _____ to**
A) Ribulose bisphosphate✓
B) Glycerate-3-phosphate
C) Hexose sugar
D) Glyceraldehyde-9-phosphate

Q.31 **In glycolysis, glycerate-1,3-bisphosphate is converted into glycerate-3-phosphate by losing _____ phosphate molecules.**
A) 3
B) 1✓
C) 2
D) 4

Q.32 **Malate is oxidized by _____ to oxaloacetate in Krebs's Cycle.**
A) ATP
B) NAD✓
C) NADP
D) FAD

Q.33 **In electron transport chain, the electrons from NADH and FADH2 are passed to;**
A) Cytochrome a
B) Co-enzyme c
C) Cytochrome a_3
D) Co-enzyme Q✓

Q.34 **Carriers of the respiratory chain are located on:**
A) Matrix of mitochondria
B) Inner membrane of mitochondria✓
C) Outer membrane of mitochondria
D) Cytoplasmic matrix

Q.35 **Each _____ consists of a light gathering antenna complex and reaction center.**
A) Chlorophyll
B) Photon
C) Photosystem✓
D) Electron

Ecosystem

Q.1 **Group of interbreeding individuals of particular species, sharing common geographical area is called:**
A) Population✓
B) Community
C) Community ecology
D) Autecology

Q.2 **Ozone filters ultraviolet radiations from the sun in the upper**
A) Biosphere
B) Lithosphere
C) Atmosphere✓
D) Hydrosphere

Q.3 **A parasite living inside body of the host is called**
A) Ectoparasite
B) Facultative parasite
C) Obligate parasite
D) Endoparasite✓

Q.4 **An association between two organisms benefiting both is called**
A) Commensalism
B) Predation
C) Parasitism
D) Symbiosis✓

Q.5 **In aquatic ecosystem, human activities may accelerate the process of**
A) Eutrophication✓
B) Decomposition
C) Photosynthesis
D) Recycling

Q.6 **Beri Beri is due to**
A) Metabolic disorder **B) Nutritional deficiency✓**
C) Chemical causes D) Mental Illness

Q.7 **The natural heat energy trapped underground is**
A) Geothermal energy✓ B) Electric energy
C) Thermal energy D) Solar energy

Q.8 **Diseases in living organisms which are caused by parasites are called:**
A) Disinfestations B) Infections
C) Antisepsis **D) Infestations✓**

Q.9 **The nutrient cycles are also called:**
A) Biogeochemical cycles✓ B) Bio element cycles
C) Biochemical cycles D) Geochemical cycles

Q.10 **The productivity of aquatic ecosystem is determined by:**
A) Water B) Light
C) Light and nutrients✓ D) Nutrients

Q.11 **What is the drawback of nuclear energy?**
A) It causes radiation pollution✓ B) It is very expensive
C) It is not long lasting D) It pollutes the air

Q.12 **Pick the biotic component from the following.**
A) Soil. B) Atmosphere.
C) Water. **D) Animals.✓**

Q.13 **In _____ zone the light is insufficient to support photosynthesis.**
A) Desert. B) Littoral.
C) Profundal.✓ D) All of these.

Q.14 **Which one of the following is depleting and causing thinning of ozone?**
A) Chlorine **B) Chlorofluorocarbon✓**
C) Bromine D) Carbon

Q.15 **The typical environment of a particular organism population community is called**
A) Niche **B) Habitat✓**
C) Ecosystem D) Biosphere

Q.16 **Excessive enrichment of water with nutrients by human activity by which large amount of living organic matter grows is called**
A) Archeotrophication B) Enrichment
C) Eutrophication✓ D) Low Trophication

Q.17 **In an ecosystem, mycorrhizae is an example of**
A) Symbiosis✓ B) Commensalism
C) Predation D) Parasitism

Q.18 **Successive stages of eating and being eaten by which recycling of materials and flow of energy takes place is called**
A) Food Chain✓ B) Trophic Level
C) Food Web D) Food Link

Q.19 **What is the niche of an organism in an ecosystem?**
A) Role played by many organisms in an ecosystem
C) Role played by a dead organism in an ecosystem
B) Role played by community of microorganisms in their ecosystem
D) Role played by an organism in its ecosystem.✓

Q.20 **The distinct levels or links of food chain are called**
A) Trophic level✓
C) Food web
B) Energy pyramid
D) Food chain

Q.21 **A relationship between two or more organisms of different species in which all partners get benefit is called**
A) Symbiosis✓
C) Parasitism
B) Commensalism
D) Predation

Q.22 **Bacteria and fungi are examples of**
A) Producers
C) Decomposers✓
B) Consumers
D) Denvers

Q.23 **The cause of acid rain is**
A) Oxides of carbon
C) Oxides of nitrogen and Sulphur✓
B) Oxides of Sulphur
D) Oxides of nitrogen

Q.24 **In an ecosystem mycorrhizae are an example of:**
A) Predation
C) Symbiosis✓
B) Mutualism
D) Parasitism

Q.25 **As a result of destruction of ozone layer there is significant increase in:**
A) Ultra-violet radiations✓
C) Greenhouse gases
B) Nitrogen oxide
D) Sulphur oxide

Reproduction

Q.1 **The first cells produced by the repeated cell division of germinal epithelium of testis are**
A) Interstitial cells
C) Spermatogonia✓
B) Secondary spermatocytes
D) Spermatids

Q.2 **Which of the following sequence is correct?**
A) LH→FSH→Estrogen→Progesterone
C) FSH→LH→Progesterone→Estrogen
B) FSH→Estrogen→Progesterone→LH
D)
FSH→Estrogen→LH→Progesterone✓

Q.3 **Grey equatorial cytoplasm produces**
A) Muscle cells
C) Gut
B) Notochord and neural tube✓
D) Larval epidermis

Q.4 **Newborn infant may acquire serious eye infections, if his/her mother has:**
A) Genital herpes
C) AIDS
B) Gonorrhea✓
D) Syphilis

Q.5 **Enzyme after catalysis detaches itself from the product:**
A) Completely
C) Incompletely
B) Changed
D) Unchanged✓

Q.6 **A type of cell in human testes which produces testosterone is called**
A) Interstitial Cells✓
C) Germ Cells
B) Sertoli Cells
D) Spermatocytes

Q.7 **Breakdown of endometrium during menstruation is due to**
A) Increase in Level of LH
C) Decrease in Level of Progesterone✓
B) Increase in Level of Progesterone
D) Increase in Level of Oestrogen

Q.8 **Oogonia are produced in the germ cells**
A) Both Uterus and Cervix
B) Uterus
C) Cervix
D) Ovary✓

Q.9 **Luteinizing hormone triggers**
A) Cessation of Oogenesis
B) Ovulation✓
C) Breakdown of Oocyte
D) Development of Zygote

Q.10 **Syphilis is a sexually transmitted disease which is caused by**
A) HIV / AIDS
B) Treponema Pallidum✓
C) Pseudomonas Pyogenes
D) Neisseria

Q.11 **Syphilis is a sexually transmitted disease which is caused by**
A) Neisseria gonorrhoeae
B) Treponema pallidum✓
C) E. coli
D) Mycobacterium avium

Q.12 **Discharge of ovum or secondary oocyte from ovary or from Graafian follicle is called**
A) Fertilization
B) Follicle formation
C) Pollination
D) Ovulation✓

Q.13 **Second meiotic division in the secondary oocyte proceeds as far as**
A) Metaphase✓
B) Anaphase
C) Prophase
D) Telophase

Q.14 **Which one of the following differentiates directly into mature sperm?**
A) Primary spermatocyte
B) Spermatogonia
C) Secondary spermatocyte
D) Spermatid✓

Q.15 **Uterus opens into the vagina through**
A) Cervix✓
B) External genitalia
C) Fallopian tube
D) Vulva

Q.16 **Spermatogonia differentiate directly into?**
A) Primary spermatocytes✓
B) Spermatozoa
C) Secondary spermatocytes
D) Spermatids

Q.17 **Treponema palladium causes?**
A) AIDS
B) Syphilis✓
C) Genital herpes
D) Gonorrhea

Q.18 **What is the location of interstitial cells in testes?**
A) Inside the seminiferous tubules
C) Between the seminiferous tubules✓
B) Among the germinal epithelial cells
D) Around the testes

Q.19 **A type of cells in human testes which produce testosterone are called?**
A) Germ cells
B) Interstitial cells✓
C) Sertoli cells
D) Spermatocytes

Q.20 **The hormone produced from corpus luteum is:**
A) Prolactin
B) Progesterone✓
C) FSH
D) LH

Q.21 **Testosterone is produced by which one of the following?**
A) Sertoli cells
B) Interstitial cells✓
C) Germinal epithelium
D) Spermatogonia

Q.22 **The oocyte released during ovulation is in**
A) Anaphase I
B) Metaphase I

C) Prophase I
D) Metaphase II✓

Q.23 Yellowish glandular structure formed after the release of egg from follicle is called
A) Corpus callosum
B) Corpus luteum✓
C) Graafian follicle
D) Follicle atresia

Q.24 On puberty, the development of primary follicles is stimulated by
A) ICSH
B) LH
C) FSH✓
D) Estrogen

Q.25 Causative agent of a sexually transmitted disease that affects mucous membrane of the urinogenital tract is
A) Staphylococcus aureus
B) Neisseria gonorrhoeae✓
C) Treponema pallidum
D) Escherichia coli

Biotechnology

Q.1 Gene can be synthesized in laboratory from messenger RNA by using:
A) Restriction enzymes
B) Vector
C) cDNA (complementary DNA)
D) Reverse transcriptase✓

Q.2 Antibiotic resistance gene for tetracycline and ampicillin are present in the plasmid
A) pSC 101
B) pBR 322✓
C) pCR 101
D) pBR 233

Q.3 Cloning is a form of
A) Sexual Reproduction
B) Vegetative Propagation
C) Asexual Reproduction✓
D) Genetic Recombination

Q.4 Temperature-insensitive (thermostable) enzyme used in PCR is:
A) DNA polymerase I
B) DNA ligase
C) DNA polymerase III
D) Taq polymerase✓

Q.5 Cloning is a form of:
A) Parthenogenesis
B) Sexual Reproduction
C) Apomixis
D) Asexual Reproduction✓

Q.6 Antigens to treat Non-Hodgkin's lymphoma are produced by:
A) Wheat Plant
B) Tobacco Plant✓
C) Rice Plant
D) Corn Plant

Q.7 _____ are used as important vectors in genetic engineering.
A) Ribosomes
B) Nucleoids
C) Plasmids✓
D) Mesosomes

Q.8 The cell suspension culture of _____ produces quinine.
A) Soybean.
B) Digitalis lanata.
C) Cinchona ledgeriana.✓
D) Luceferin.

Q.9 Posomes are used in gene therapy against
A) Hypercholesterolemia
C) Coronary Artery Angioplasty
B) Cystic Fibrosis✓
D) Severe Combined Immunodeficiency Syndrome (SCID)

Q.10 Genetically engineered cells are introduced into bone marrow cells in the treatment of

A) Hypercholesterolemia
C) Severe Combined Immunodeficiency Syndrome✓
B) Cystic Fibrosis
D) Coronary Artery Angioplasty (SCID)

Q.11 The common vectors used in recombinant DNA technology are
A) Probes
B) Plasmids✓
C) Palindromes
D) Prions

Q.12 The enzyme used to isolate gene from DNA is
A) Helicase
B) Restriction Enzyme✓
C) Reverse Transcriptase
D) DNA Polymerase

Q.13 Which one of the following enzymes is temperature insensitive?
A) DNA Polymerase I
B) DNA Polymerase III
C) Taq Polymerase✓
D) RNA Polymerase

Q.14 In recombinant DNA technology _____ are tools for manipulating DNA
A) Viruses
B) Enzymes✓
C) Chromosomes
D) Genes

Q.15 In DNA finger printing process, the use of _____ produces distinctive pattern on autoradiography or X-ray film
A) Restriction enzyme
B) Macrosatellites
C) Microsatellites
D) Probes for genetic markers✓

Q.16 In the recombinant DNA technology plasmids are used as
A) Genetic material
B) Vectors✓
C) Enzymes
D) Probes

Q.17 In which process, multiple copies of the desired genes are produced?
A) Polymerase chain reaction✓
B) Analyzing DNA
C) Gene sequencing
D) DNA finger printing

Q.18 The enzyme adenosine deaminase is missing in person suffering from:
A) Cystic fibrosis
C) Hypercholesterolemia
B) Severe combined immunodeficiency syndrome✓
D) Parkinson's disease

Q.19 The DNA molecule formed from messenger-RNA by reverse transcriptase is called??
A) Complementary DNA✓
B) Chimeric DNA
C) Recombinant DNA
D) Plasmid DNA

Q.20 The agent which separates the two strands of DNA in PCR is??
A) DNA ligase
B) Heat✓
C) Primer
D) Helicase

Q.21 Cystic fibrosis patient lack a gene that codes for trans-membrane carrier of??
A) Na+ ions
B) Ca^{++} ions
C) Cl— ions✓
D) K^{+} ions

Q.22 The phage commonly used as a vector in genetic engineering is?
A) Lambda phage✓
B) T_2 phage
C) Gamma phage
D) T_4 phage

Q.23 Restriction endonucleases are naturally occurring enzymes of:
A) Viruses
B) Fungi

C) Bacteria✓ D) Plants

Q.24 pBr 322 have antibiotic resistance gene for
A) Ampicillin and aspirin **B) Ampicillin and Tetracycline✓**
C) Streptomycin and metronidazole D) Penicillin and metronidazole

Q.25 Cystic Fibrosis affects which one of the following cells of the body?
A) Epithelial cells✓ B) Plasma cells
C) Endothelial cells D) Blood cells

Evolution / Genetics

Q.1 Which chromosomal abnormality in humans causes aggressive and antisocial behavior?
A) XO **B) XYY✓**
C) XXY D) XXX

Q.2 Sickle cell Anaemia is an example of which type of chromosomal defect?
A) Chromosomal rearrangement B) Chromosomal aberration
C) Transposition of gene **D) Point mutation✓**

Q.3 The karyotype of an individual is _____ of chromosomes.
A) Number B) Types
C) Number, types and chemical composition
D) Number and types✓

Q.4 The process of replication of DNA begins at
A) One place only without any specific sequence of DNA
C) One or more places without any specific sequence of DNA
B) Any place with the uncoiling of two strands of DNA
D) One or more places where there is a specific sequence of nucleotides✓

Q.5 Amino acid attaches at which site of RNA
A) Anticodon site **B) 3'-site with terminal OH✓**
C) Ribosomes recognition site D) Activation enzyme recognition site

Q.6 When a disease is transmitted directly from an affected father to his son, it is called:
A) X-linked **B) Y-linked✓**
C) Autosomal D) X and Y-linked

Q.7 Epistasis is a relationship between:
A) Alleles of a gene
C) Two different genes at the same locus
B) Two contrasting traits
D) Two different genes at different loci✓

Q.8 Gene for albinism in man is present on chromosome number:
A) 11✓ B) 21
C) 22 D) 12

Q.9 If DNA strand is GCTATGG mRNA strand synthesized from it would be:
A) CGAUACC **B) CGATACC✓**
C) CGTATGC D) CGUTCC

Q.10 Microcephaly, the small sized skull is due to:
A) Nutritional Cause B) Hormonal Causes

C) Skeleton Damage✓ D) Genetic Defect

Q.11 In phenylketonuria, phenylalanine is not degraded because of defective enzyme:
A) Phenylalanine hydrogenase C) Phenylalanine oxidase
C) Phenylalanine phosphate✓ D) None of these

Q.12 Males with XXY chromosomes suffer from:
A) Klinefelter's Syndrome B) Down's Syndrome
C) Jacob's Syndrome **D) Edward's Syndrome✓**

Q.13 When phenotype of a heterozygote is in between the phenotypes of both the homozygote parents, it is called:
A) Incomplete dominance✓ B) Pleiotropy
C) Epistasis D) Codominance

Q.14 Which one of correct about 'Rh$^+$' blood?
A) Will produce anti-Rh antibodies if given Rh$^+$ blood✓
C) Cannot produce anti-Rh antibodies in any case
B) Rh$^+$ antigens are present on RBCs
D) Rh$^+$ antibodies are present in blood

Q.15 The survival of an organism during the struggle for existence is not random, but depends on:
A) Its genetic constitution✓ B) Its ability to over-produce
C) Its ability to acquire characters D) Its ability to over-eat

Q.16 Evolutionary relationships amongst species are reflected in their:
A) DNA and proteins✓ B) DNA and gene
C) RNAs and proteins D) DNA and RNAs

Q.17 If all the members of a population are homozygous for the same allele, that allele is said to be:
A) Random in population's pool B) Random in a species
C) Fixed in population's pool **D) Fixed in the gene pool✓**

Q.18 What is true about pattern baldness?
A) It is autosomal recessive disease in males
C) It is autosomal dominant disease in males✓
B) It is X-linked disease D) It is Y-linked disease

.19 In what direction, can a DNA polymerase work when catalyzing the addition of nucleotide monomers to build a strand of DNA?
A) From the 5' toward the 3' end of the new strand being assembled.
C) From the replication centers in two directions called replication forks.✓
B) From the 3' to the 5' end of the strand being assembled.
D) In both directions if DNA ligase is present.

20 In moths' male is _____
A) Heterogametic. **B) Homogametic.✓**
C) Dieogametic. D) Both B and C.

→ Your Brother Shoukat Khan

→ Give full attention to your Studies

→ So that you can get admission in Public Sector Universities