

CHAPTER # 1**ETEA 2005**

1. The number of oxygen atoms in 0.5 mole of $Al_2(CO_3)_3$ is:

- (a) 4.5×10^{23}
 (b) 3.6×10^{24}
 (c) 2.7×10^{24}
 (d) 9.0×10^{23}

2. Calculate the volume occupied by 2.8g of nitrogen gas at STP:

- (a) $22.4dm^3$ (b) $2.24dm^3$
 (c) $44.8dm^3$ (d) $4.48dm^3$

3. Calculate the number of moles NaCl in 75.0g of table salt?

- (a) 0.643 (b) 0.799
 (c) 28.0 (d) 1.28

ETEA 2006

4. If water sample are taken from sea, river, clouds, lakes or snow they will be found or contain hydrogen and oxygen in the ratio of 1:8 by weight. This indicates the law of:

- (a) Definite proportion
 (b) Multiple proportions
 (c) Reciprocal proportion
 (d) None of the above

ETEA 2008

5. Which one of the following contains the greatest number of atoms?

- (a) 4g of hydrogen
 (b) 4g of magnesium
 (c) 71g of chlorine
 (d) 127g of iodine

6. How many moles of NaCl are produced from the reaction of

6.022×10^{23} ?

- (a) 6.022×10^{23} mol
 (b) 0.5 mol
 (c) 3.011×10^{23} mol
 (d) 1 mole

7. If 28.0g nitrogen gas is reacted with 8.0g of hydrogen gas to form ammonia, the limiting reactant among the two will be:

- (a) N_2 (b) H_2
 (c) Both a & b (d) None

8. 10L of Cl_2 gas reacts with 40L of H_2 gas under same conditions of temperature and pressure. How much volume of HCl should be produced?

- (a) 40L (b) 30L
 (c) 20L (d) 10L

ETEA 2010

9. A gas at STP contains only 6.02×10^{23} atoms and is monoatomic it will occupy:

- (a) 1.2L (b) 22.4L
 (c) 30.5L (d) 44.8L

ETEA 2011

10. A sample containing aluminum weighing 10.0 g yielded 2.0g of aluminiumsulphide. What is the percentage of Al in the sample? (Al atomic mass = 27) in the sample? (Sulphur atomic mass = 32.0)

- (a) $= \frac{2.0}{10.0} \times 100$
 (b) $= \frac{2.0}{10.0} \times \frac{2.0 \times 27}{150} \times 100$
 (c) $= \frac{2.0}{10.0} \times \frac{27}{1500} \times 100$

$$(d) = \frac{2.0}{10.0} \times \frac{150}{3 \times 27} \times 100$$

11. The combustion of one mole of propane C_3H_8 produces how many moles of water?

- (a) 2 (b) 3
(c) 4 (d) 5

12. How many grams of water are produced in burning 2.24 dm³ of hydrogen at STP?

- (a) 180g (b) 81g
(c) 1.8g (d) 0.18g

ETEA 2012

13. How many hydrogen atoms are present in one mole of water?

- (a) 1.086×10^{24} atoms
(b) 1.204×10^{24} atoms
(c) 3.01×10^{23} atoms
(d) 6.02×10^{23} atoms

14. The volume occupied by 3.2g of oxygen at STP is

- (a) 22.4dm³ (b) 2.24dm³
(c) 11.2dm³ (d) 16.0dm³

15. How many atoms are contained in one mole of $Ca(OH)_2$?

- (a) $5 \times 6.02 \times 10^{23}$ atoms
(b) $30 \times 6.02 \times 10^{23}$ atoms
(c) $3 \times 6.02 \times 10^{23}$ atoms
(d) $6 \times 6.02 \times 10^{23}$ atoms

16. One mole is the amount of substance which contains as many elementary entities as contained in.....

- (a) 0.12kg of ${}^{12}_6C$
(b) 1.2kg of ${}^{12}_6C$
(c) 0.012kg of ${}^{12}_6C$
(d) 0.12kg of ${}^{16}_8O$

17. 1 amu is equal to 1.661×10^{-24} g, then 1.0g will be equal to

- (a) 6.02×10^{23} amu
(b) 6.02×10^{-23} amu
(c) 6.02×10^{-24} amu
(d) 6.02×10^{24} amu

ETEA 2013

18. Which gas occupies largest volume at STP?

- (a) 16g of CH_4
(b) 32g of O_2
(c) 4g of H_2
(d) 28g of N_2

19. A sample of carbon-12 has a mass of 3.0g. Which expression gives the number of atoms in the sample? (N_A is the number of Avogadro's constant)

- (a) $0.0030N_A$
(b) $0.25N_A$
(c) $3.0N_A$
(d) $4.0N_A$

20. How many molecules are present in 0.20g of hydrogen gas?

- (a) $\frac{0.20}{1.008} \times 6.02 \times 10^{23}$
(b) 0.20×2.016
(c) $\frac{0.20}{2.016} \times 6.02 \times 10^{23}$
(d) $\frac{0.20}{0.70} \times 6.02 \times 10^{23}$

ETEA 2014

21. Choose the correct relation about the percent yield. It is equal to.....

- (a) $\frac{\text{actual yield}}{\text{theoretical yield}} \times 100$
 (b) $\frac{\text{theoretical yield}}{\text{actual yield}} \times 100$
 (c) $\frac{\text{actual yield}}{\text{theoretical yield}} \times 10^6$
 (d) $\frac{\text{actual yield}}{\text{theoretical yield}} \times 10^3$

ETEA 2015

22. Which of the following contain maximum number of atoms?

- (a) 6mol of sulphur (S)
 (b) 2.0mol of S_8
 (c) 5.0mol of SO_2
 (d) 44.8 dm^3 of CO_2 at STP

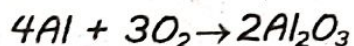
23. The numbers of atoms in 18g of H_2O are equal to.....

- (a) 6.02×10^{23} atoms
 (b) 6.02×10^{24} atoms
 (c) 1.806×10^{24} atoms
 (d) 3.052×10^{23} atoms

24. Theoretical yield is always:

- (a) Less than practical yield
 (b) Greater than actual yield
 (c) Both are equal
 (d) None of the above

25. How many grams of Al_2O_3 will be obtained if 13.5g of aluminum completely reacts with oxygen as



(molar mass of Al = 27g/mol)

- (a) 25.5g (b) 27.54g
 (c) 54.27g (d) 14.27g

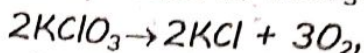
26. What is the number of hydrogen atoms in 5 moles of water?

- (a) 3.0115×10^{24} atoms
 (b) 6.02×10^{24} atoms

(c) 6.02×10^{23} atoms

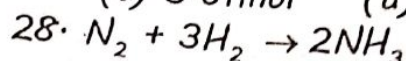
(d) 5.0×10^{23} atoms

27. Oxygen is prepared by the thermal decomposition of $KClO_3$ as



How many moles of $KClO_3$ are required to prepare 6 moles of oxygen?

- (a) 3.17mol (b) 4.0mol
 (c) 5.01mol (d) 2mol



In the above reaction the limiting reagent:

- (a) N_2 (b) H_2
 (c) Ammonia (d) None

29. Mass of 1 molecule of oxygen is:

- (a) 32g (b) 16g
 (c) $32 / 6.02 \times 10^{23} \text{ g}$
 (d) $32 \times 6.02 \times 10^{23} \text{ g}$

ETEA 2016

30. Cylinder "A" contains 4.6 grams of C_2H_5OH and cylinder "B" has 3 grams of C_2H_6 .

- (a) Both cylinder A and B have equal number of molecules
 (b) Cylinder A has greater number of molecules than cylinder B
 (c) Both cylinders have the equal number of hydrogen atoms
 (d) Both a & c

31. How many oxygen atoms are present in 278g of hydrated ferrous sulphate? ($FeSO_4 \cdot 7H_2O = 278 \text{ amu}$)

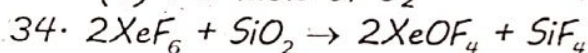
- (a) 6.023×10^{23}
 (b) $60 \times 6.02 \times 10^{23}$
 (c) 2.408×10^{24}
 (d) 6.023

32. 60 a.m.u of carbon contain carbon atoms:

- (a) 60
- (b) $60 \times 6.02 \times 10^{23}$
- (c) $5 \times 6.02 \times 10^{23}$
- (d) 5

33. Which of the following sample contain maximum number of atoms?

- (a) 4 grams of H_2
- (b) 28 grams of N_2
- (c) 22.4 dm^3 of CO_2 at STP
- (d) 1.5 mole of O_2



Consider the above chemical reaction. If 122.6g of XeF_6 reacts with 60g of SiO_2 to form the products. Select the limiting reagent and amount of SiF_4 formed? [$XeF_6 = 245.3 \text{ amu}$, $SiO_2 = 60 \text{ amu}$, $SiF_4 = 104 \text{ amu}$]

- (a) XeF_6 , 26g
- (b) SiO_2 , 26g
- (c) XeF_6 , 52g
- (d) SiO_2 , 52g

35. Consider the following reaction involved in the manufacture of urea

$$CO_2 + 2NH_3 \rightarrow NH_2COONH_4$$

If 22.0g of CO_2 react 34g of ammonia to form ammonium carbonate, the reaction is taken as, irreversible and go to completion. Identify the limiting reagent and the amount of carbamate formed.

- (a) CO_2 , 78g
- (b) NH_3 , 78g
- (c) CO_2 , 39g
- (d) NH_3 , 39g

36. What volume is required for complete combustion of 5 cm^3 of CH_4 and 5 cm^3 of C_2H_4 in same conditions?

tions?

- (a) 5 cm^3
- (b) 10 cm^3
- (c) 25 cm^3
- (d) 15 cm^3

37. DDT is used as insecticides its molar mass is 354.5 g/mol when DDT was analyzed by chemist he found that it contained 47.4% carbon. How many carbon atoms are there in DDT molecule?

- (a) 10
- (b) 12
- (c) 14
- (d) 16

38. A ring contains 1.2 gram of diamond, the number of carbon atoms in the ring are:

- (a) $N_A/10$
- (b) N_A
- (c) $N_A/2$
- (d) $1.2 N_A$

ETEA 2017

39. The largest number of molecules are present in the.....

- (a) 22g of CO_2
- (b) 64g of O_2
- (c) 14g of N_2
- (d) 90g of H_2SO_4

ETEA 2018

40. The number of gram atoms in 3g hydrogen atoms is same the number of gram atoms in 48g of.....

- (a) N
- (b) C
- (c) O
- (d) O_2

41. Which compound with the given information has greater mass in Kg?

- (a) $22.4 \text{ dm}^3 N_2$ at STP
- (b) 2 moles of CO
- (c) 6.02×10^{23} molecules of C_2H_4
- (d) All have equal mass

42. Phosphorous exists in nature as tetra atomic molecule. The number of atoms present in 1 gram molecule of phosphorous are:

- (a) 6.023×10^{23}
 (b) $2 \times 6.023 \times 10^{23}$
 (c) $3 \times 6.023 \times 10^{23}$
 (d) None of these

43. The volume of CO_2 produced by heating 33.5g Li_2CO_3 at room temperature and pressure is (M.Wt $\text{Li}_2\text{CO}_3 = 67 \text{ g/mol}$).....

- (a) 22.4 dm^3 (b) 12.0 dm^3
 (c) 11.2 dm^3 (d) 24.0 dm^3

44. $2\text{KClO}_3 \rightarrow 2\text{KCl} + 3\text{O}_2$

For the production of 33.6 dm^3 of O_2 at STP the mass of KClO_3 to be decomposed is: (M.Wt $\text{KClO}_3 = 122.5 \text{ g/mol}$)

- (a) 245.0g (b) 61.25g
 (c) 122.5g (d) 367.5g

ETEA 2019

45. Which contains highest percentage of nitrogen?

- (a) NO (b) NO_2
 (c) N_2O (d) N_2O_5

46. A mixture of 10 cm^3 of oxygen and 50 cm^3 of hydrogen is sparked continuously. What is the maximum theoretical decrease in volume?

- (a) 10 cm^3 (b) 15 cm^3
 (c) 20 cm^3 (d) 30 cm^3

47. 20 cm^3 CH_4 gas was burnt in 40 cm^3 O_2 gas to produce CO_2 as:
 $\text{CH}_4 + 2\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$. The limiting reactant in this equation is:

- (a) O_2 (b) CH_4
 (c) CO_2 (d) None

48. A give sample AlCl_3 contains 6.02×10^{30} Al^{+3} ions. The mole of Cl^- ion will be.....

- (a) 1.0×10^3
 (b) 3×10^7
 (c) 3×10^3
 (d) 0.33×10^3

49. One mole of which of the following Bucky ball will have more molecules.....

- (a) C-20 (b) C-50
 (c) C-60 (d) All same

50. Avogadro's constant is the number of.....

- (a) Atoms in 1g of He
 (b) Molecules in 35.5g of chlorine
 (c) Electrons present in 2g H
 (d) Atoms in 24g Mg

ANSWER KEY

1.c	2.b	3.d	4.a	5.a	6.d
7.a	8.c	9.b	10.b	11.c	12.c
13.b	14.b	15.a	16.c	17.a	18.c
19.b	20.c	21.a	22.b	23.c	24.b
25.a	26.b	27.b	28.d	29.c	30.d
31.b	32.d	33.a	34.a	35.c	36.c
37.c	38.a	39.b	40.c	41.b	42.d
43.b	44.c	45.c	46.d	47.d	48.b
49.d	50.d				



CHAPTER #2**ETEA 2005**

1. Which one of the following series is observed in the visible region of electromagnetic radiation?

- (a) p-fund series
- (b) Balmer series
- (c) Lyman series
- (d) Brackett series

ETEA 2006

2. The constancy of e/m ration for electron shows that:

- (a) Electron mass is $1/837^{\text{th}}$ of proton
- (b) Electrons are universal particles of all matter
- (c) Electrons are produced in discharge tube only
- (d) None of the above

ETEA 2007

3. Transition from $n=4,5,6\ldots$ to $n=3$ in hydrogen spectrum gives?

- (a) P-fund series
- (b) Lyman series
- (c) Paschen series
- (d) Brackett series

ETEA 2008

4. For H-atom which one of the following statements is correct?

- (a) The radius of the orbits are integral multiple of Bohr radius
- (b) The angular momentum is $h/2\pi$

(c) The energy in the n^{th} -orbit is n times the ground state energy

(d) None of the above

5. In the discharge tube emission, the cathode rays require:

- (a) Low potential and low pressure
- (b) Low potential and high pressure
- (c) High potential and high pressure
- (d) High potential and low pressure

ETEA 2009

6. Particles involved in an ordinary chemical reaction are.....

- (a) Protons
- (b) Neutrons
- (c) Electrons
- (d) All of the above

7. A ball of mass 1 gram is moving with a velocity of $10^3 \text{ m}\cdot\text{s}^{-1}$. The de Broglie wavelength of the ball is:

- (a) $13.26 \times 10^{-36} \text{ m}$
- (b) $3.315 \times 10^{-34} \text{ m}$
- (c) $6.63 \times 10^{-34} \text{ m}$
- (d) $4.97 \times 10^{-26} \text{ m}$

8. An orbital may never be occupied by:

- (a) 1 electron
- (b) 2 electron
- (c) 3 electron
- (d) 0 electron

9. Nitrogen has three unpaired electrons according to.....

- (a) Hund's rule
- (b) Aufbau rule

- (c) Pauli's exclusion principal
(d) Thumb rule

ETEA 2010

10. The charge of electrons was determined by the effect of electric field on rate of fall of oil droplets under gravity this was done by?

- (a) J.J. Thomson
(b) E. Rutherford
(c) R.A. Milliken
(d) W.C. Roentgen

11. Who postulated the following equation for energy emission when an electron drops from state n_2 to n_1 ?

- (a) Einstein (b) Bohr
(c) Rutherford (d) Heisenberg

12. The energy of electron in the excited state $n=4$ in hydrogen atom is.

- (a) -13.6 eV
(b) -3.4 eV
(c) -0.85 eV
(d) -1.5 eV

13. The number of orbitals in "M" shell of an atom is.

- (a) 1 (b) 4
(c) 5 (d) 9

ETEA 2011

14. The electronic configuration of gallium, atomic number 31 is.

- (a) [Ar] $4s^2 3d^{10} 4p^1$
(b) [Ar] $3s^2 3d^{10} 4p^1$
(c) [Kr] $3s^2 3d^{10} 4p^1$
(d) [Kr] $4s^2 3d^{10} 4p^1$

15. Mosely demonstrated a direct relationship between the frequency of x-rays emitted by an element bombarded with high energy electrons.

On what characteristic of the element does it depend?

- (a) Electronic configuration
(b) Atomic number
(c) Degree of ionization
(d) Atomic mass

16. The wave nature of an electron is illustrated by its

- (a) Photoelectric effect
(b) Compton effect
(c) Penetrating effect
(d) Diffraction

17. If an atom exists in the excited state $n=5$, the maximum number of transition takes place is:

- (a) 6 (b) 5
(c) 10 (d) 3

ETEA 2012

18. Which of the following rays has the longest wavelength?

- (a) Infrared rays
(b) Ultraviolet rays
(c) Gamma rays
(d) X-rays

19. The total energy of a hydrogen atom in its ground state energy is...

- (a) Zero (b) Positive
(c) Negative (d) None

20. The part of electromagnetic spectrum in which lyman series lies is.

- (a) Visible region
(b) Infrared region
(c) Ultra violet region
(d) X-rays

21. The atomic number of scandium is 21 what is its ground state elec-

tronic configuration?

- (a) $1s^2 2s^2 2p^6 3p^6 3d^8 4s^2$
- (b) $1s^2 2s^2 2p^6 3s^2 3d^7 4s^2$
- (c) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8$
- (d) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^7 4s^2$

22. Which of the following elements with given electronic configuration has the highest ionization potential value?

- (a) $1s^2 2s^2 2p^3$
- (b) $1s^2 2s^2 2p^4$
- (c) $1s^2 2s^2 2p^6 3s^1$
- (d) $1s^2 2s^2 2p^6 3s^2 3p^3$

23. The correct electronic configuration of nickel (28) is.....

- (a) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^8 4s^2$
- (b) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^7 4s^2 4p^1$
- (c) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^2 4p^2$
- (d) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^6 4s^1 4p^3$

ETEA 2013

24. Which of the following lists contains three regions of the electromagnetic spectrum in order of increasing energy?

- (a) Gamma rays, U.V rays, radio waves
- (b) Gamma rays, visible rays, U.V rays
- (c) Microwaves, U.V rays, X-rays
- (d) Radio waves, visible rays, infrared rays

25. How many different values can m , assume in the electron sub-shell designated by quantum number $n=5$, $l=4$?

- (a) 4
- (b) 5

(c) 6

(d) 9

ETEA 2014

26. Which is incorrect about ionization energy?

- (a) Ionization energy depends upon the magnitude of nuclear charge
- (b) Ionization energy depends upon the atomic radius
- (c) Ionization energy depends upon the shielding effect
- (d) Ionization energy does not depend upon the penetration effect of the inner orbital

27. Rutherford's scattering experiment demonstrates.....

- (a) The existence of x-rays
- (b) The existence of α -particles
- (c) The mass to charge ratio of electron
- (d) The nuclear model of the atom

28. Select the incorrect statement.

- (a) Molecule may gain electron to form molecular anion
- (b) Molecule may lose electron to form molecular cations
- (c) Molecular cations are less abundant than molecular anions
- (d) These molecular ions can be formed by passing

ETEA 2015

29. Two atoms A and Y have the electronic configuration given below



- (a) XY
- (b) Xy_2
- (c) X_1Y
- (d) XY_2

30. When an electron drop from

any higher orbit i.e. $n_2 \geq 3$ to the second orbit $n_1 = 2$, the spectral lines produced fall in the region.

- (a) Visible (b) Ultraviolet
(c) Infrared (d) None

31. X-rays are

- (a) Electromagnetic waves
(b) Negatively charged ions
(c) Rapidly moving electrons
(d) Rapidly moving protons

32. Number of orbitals in the 3rd shell are

- (a) 3 (b) 6
(c) 9 (d) 18

33. Which of following rays are not electromagnetic radiations?

- (a) X-rays
(b) UV rays
(c) Cathode rays
(d) Infrared rays

34. Which of following color have greater wavelengths?

- (a) Red (b) Blue
(c) Green (d) Orange

35. The radius of hydrogen atom is

- (a) $0.529 \text{ \AA}$
(b) $0.529 \times 10^{-20} \text{ m}$
(c) $0.529 \times 10^{-8} \text{ cm}$
(d) Both a and c

36. Which is NOT true in Bohr's theory?

- (a) Cannot explain the fine structure of the hydrogen atom
(b) Cannot explain spectrum of atoms other than hydrogen
(c) Cannot explain Zeeman effect

(d) Is in accordance with Heisenberg's uncertainty principle

37. The energy difference between adjacent energy level of the hydrogen atom.....

- (a) Increases with increasing energy
(b) Decreases with increasing energy
(c) First increases and then decreases with increasing energy
(d) First decreases and then increases with decreasing energy

38. Choose the correct relationship, when E = energy, h = planks constant, c = velocity of light, ν = frequency, λ = wavelength.

- (a) $E = h\nu c$
(b) $E = c/\lambda$
(c) $E = h\nu$
(d) $E = h \lambda / c$

39. In the main postulate of Bohr atomic theory, the angular momentum of electron in hydrogen atom is given by the relationship

- (a) $mv = h/2\pi$
(b) $r = Ze^2/4\pi\epsilon_0 mv$
(c) $mvr = nh/2\pi$
(d) $h\nu c$

40. State electronic configuration of Cu (29) is.

- (a) $[\text{Ar}] 4s^2 3d^9$
(b) $[\text{Ar}] 4s^0 3d^{10}$
(c) $[\text{Ar}] 4s^1 3d^{10}$
(d) $[\text{Ar}] 4s^1 3d^7 4p^2$

41. For principle quantum number $n = 3$ the value of Azimuthal quantum number will be.

- (a) 3 (b) 6
(c) 5 (d) 7

42. The frequency of green light is 6×10^{14} Hz. Its wavelength is

- (a) 50mn (b) 500mn
(c) 5000mn (d) 100mn

ETEA 2016

43. What are the values of principle quantum number and azimuthal quantum number for the last electron in chlorine atom?

- (a) 1,6 (b) 1,3
(c) 3,1 (d) 6,1

44. The total energy of a hydrogen atom in its ground state is

- (a) Zero (b) Negative
(c) Positive
(d) None of these

45. Which of the following elements with the given electronic configuration has the highest ionization energy?

- (a) $1s^2 2s^2 2p^4$
(b) $1s^2 2s^2 2p^3$
(c) $1s^2 2s^2 2p^6 3s^1$
(d) $1s^2 2s^2 2p^6 3s^2 3p^3$

46. Shown below are portion of orbital diagrams representing the ground state electronic configuration of certain elements. Which of them obeys the Pauli's exclusion principle and Hund's rules.

- (a) $\uparrow \uparrow \uparrow \uparrow$ (b) $\uparrow \uparrow \downarrow \downarrow$
(c) $\uparrow \uparrow \uparrow \downarrow$ (d) $\uparrow \uparrow \uparrow \downarrow$

47. Which of the following electronic configuration is/are correct?

(i) ${}_{11}\text{Na } 1s^2 2s^2 2p^6 3s^1$

(ii) ${}_{29}\text{Cu } [\text{Ar}] 4s^1 3d^{10}$

(iii) ${}_{24}\text{Cr } [\text{Ar}] 4s^2 3d^4$

- (a) I only
(b) I and iii only
(c) I and ii only
(d) ii and iii only

48. A radium atom ${}^{226}\text{Ra}$ ($Z=86$) emits an alpha particle. The number of protons in the resulting atom is.

- (a) 84 (b) 85
(c) 86 (d) 88

49. Which of the following cannot be explained by Bohr's theory?

- (a) Be^{++} (b) H
(c) He (d) Li^{++}

50. X-rays are widely used as a diagnostic tool in medicine because of its.

- (a) Particle property
(b) Cost of x-ray unit is low
(c) High penetrating power
(d) It is not electromagnetic waves

51. Which of the following has the same number of electrons as in alpha particles?

- (a) He (b) H
(c) H^+ (d) Li^+

52. When hydrogen gas is enclosed in a discharge tube using low pressure, it emits.

- (a) Green light
(b) Blue light
(c) Red light
(d) Yellow light

53. Which two nuclei contain the

same number of neutrons?

- (a) $^{12}_6\text{C}$ and $^{14}_6\text{C}$
 (b) $^{16}_7\text{N}$ and $^{15}_8\text{C}$
 (c) $^{23}_{11}\text{Na}$ and $^{24}_{12}\text{Mg}$
 (d) $^{32}_{14}\text{Si}$ and $^{32}_{15}\text{P}$

54. Which of the following species have the same number of neutrons and electrons as in C-14?

- (a) $^{17}_7\text{N}^1$ (b) $^{19}_9\text{F}^1$
 (c) $^{16}_8\text{O}^{+2}$ (d) $^{28}_{14}\text{Si}$

ETEA 2017

55. Choose the correct arrangement of the various regions of the electromagnetic spectrum in terms of wave lengths.

- (a) IR > uv > visible > Microwave > radio frequency
 (b) Microwave > IR > uv > visible > radio frequency
 (c) Radio frequency > microwave > IR > visible > uv
 (d) Visible > IR > uv > Microwave > IR > visible > uv

56. Select the one having half-filled P orbital's on losing an electron.

- (a) Nitrogen (b) Lithium
 (c) Oxygen (d) Fluorine

57. Select the electronic configuration which can form easily-3 oxidation state.

- (a) $1s^2 2s^2 2p^6 3s^2 3p^1$
 (b) $1s^2 2s^2 2p^6 3s^2 3p^3$
 (c) $1s^2 2s^2 2p^1$
 (d) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4p^2$

58. An X-ray photon due to transition from M-shell to the vacancy in the K-shell is called.

- (a) $K\alpha$ characteristic β of x-ray

- (b) $K\beta$ Characteristic of x-ray
 (c) $K\gamma$ characteristic of x-ray
 (d) K characteristic of x-ray

59. Which of the following electronic configuration is/are correct?

- (i) $\text{Cu}_{29}[\text{Ar}]4s^1 3d^{10}$
 (ii) $\text{Ti}_{22}[\text{Ar}]4s^2 3d^2$
 (iii) $\text{Fe}_{26}[\text{Ar}]4s^2 3d^6 4p^1$
 (a) I only
 (b) I & ii only
 (c) ii & iii only
 (d) I & iii only

60. When a hydrogen atom makes the transition from the second excited state to the ground state (at 13.6 eV) the energy of the photon emitted is.

- (a) 1.5 eV (b) 9.1 eV
 (c) 12.1 eV (d) 10.2 eV

ETEA 2018

61. The energy of electron in the first excited state of hydrogen atom in J/atom is.

- (a) 2.8×10^{-18}
 (b) 0.545×10^{-18}
 (c) -2.18×10^{-18}
 (d) -1312.36

62. Which of the following series lie in the visible region?

- (a) Lyman (b) Paschen
 (c) Balmer (d) Pfund

63. Which of the following contain one unpaired electron?

- (a) Zn^{+2} (b) K^+
 (c) Cu^{+2} (d) Na^+

64. Which list shows electromagnetic waves in order of increasing frequency?

- (a) Radio $\rightarrow$ waves $\rightarrow$ gamma rays $\rightarrow$ ultraviolet $\rightarrow$ infra-red
 (b) Radio waves $\rightarrow$ infra-red $\rightarrow$ ultraviolet $\rightarrow$ gamma rays
 (c) Ultraviolet $\rightarrow$ gamma rays $\rightarrow$ radio waves $\rightarrow$ infra-red
 (d) Ultraviolet $\rightarrow$ infra-red $\rightarrow$ radio waves $\rightarrow$ gamma rays

65. If the required excitation voltage is given, for which element the x-rays spectrum consists of three spectral line i.e. $K\alpha$, $K\beta$, $L\alpha$.

- (a) Na (b) Boron
 (c) K (d) Ca

66. If 13.6 eV energy is required to ionize the hydrogen atom, then the required energy to remove an electron from $n=2$ is:

- (a) 10.2 eV (b) 0 eV
 (c) -3.4 eV (d) 6.8 eV

67. The rays with a particle nature are:

- (a) γ -rays (b) X-rays
 (c) Cathode rays
 (d) Cosmic rays

68. In what way do the atoms of the isotopes $^{12}_6\text{C}$, $^{13}_6\text{C}$, $^{14}_6\text{C}$ differ?

- (a) Different charge
 (b) Different number of electrons
 (c) Different number of neutrons
 (d) Different number of protons

69. The magnetic quantum number for the last sub orbit having 3 electrons in phosphorous $^{31}_{15}\text{P}$ is:

- (a) -1, 0, +1 (b) -1, 0, -1
 (c) 0, -1, +2 (d) -1, +1, -2

70. X-rays with lowest energy is:

- (a) $K\alpha$ (b) $L\alpha$ (c) $K\beta$ (d) $K\gamma$

71. For the production of X-rays, the electron transition is from.....

- (a) $n=3$ to $n=2$ (b) $n=1$ to $n=2$
 (c) $n=2$ to $n=1$ (d) $n=2$ to $n=3$

ETEA 2019

72. Which electronic level will allow the hydrogen atom in ground state is equal to:

- (a) $h/2\pi$ (b) $2h/2\pi$
 (c) $\pi/2h$ (d) $2\pi/h$

73. Which electronic level will allow the hydrogen atom to absorb a photon but not emit?

- (a) 1s (b) $2s^2p^3d$
 (c) $2p^3d$ (d) 3d

74. Which one of the following ions has more electrons than protons and more protons than neutrons?

- (a) D (b) D^+ (c) H^+ (d) He

75. Quantum number which describes the orientation of orbitals in three dimensional space is:

- (a) Spin quantum number
 (b) Azimuthal quantum number
 (c) Magnetic quantum number
 (d) Principal quantum number

ANSWER KEY

1.b	2.b	3.c	4.b	5.d	6.c
7.c	8.c	9.a	10.c	11.b	12.c
13.d	14.a	15.b	16.d	17.c	18.a
19.c	20.c	21.d	22.a	23.a	24.c
25.d	26.d	27.d	28.c	29.a	30.a
31.a	32.c	33.c	34.a	35.d	36.d
37.b	38.c	39.c	40.c	41.a	42.b
43.c	44.b	45.b	46.c	47.c	48.a
49.c	50.c	51.c	52.b	53.c	54.c
55.c	56.c	57.b	58.b	59.a	60.c
61.b	62.c	63.c	64.b	65.a	66.c
67.c	68.c	69.a	70.b	71.c	72.a
73.a	74.a	75.c			



CHAPTER # 3**ETEA 2005**

1. Which of the following pairs of molecules have similar geometry?

- (a) CO_2 and SO_2
- (b) BF_3 and NH_3
- (c) MgCl_2 and AlCl_3
- (d) CH_4 and SiH_4

2. What happens to the molecules when its atoms are brought closer than the bond length between them?

- (a) Molecule becomes unstable
- (b) Molecule becomes more stable
- (c) Molecule starts vibrating
- (d) Stability of the molecule remain unchanged

3. What type of hybrid orbitals are used by the carbon atoms in C_2H_4 ?

- (a) SP
- (b) SP^2
- (c) D^2SP^2
- (d) SP^3

ETEA 2008

4. The longest bond is of.....

- (a) H-I
- (b) H-O
- (c) H-S
- (d) H-Cl

5. Which one of the following is an electron deficient compound:

- (a) NH_3
- (b) PH_3
- (c) PCl_3
- (d) BCl_3

6. What types (s) of bonds is/are present in NH_4Cl ?

- (a) Ionic
- (b) Covalent
- (c) Co-ordinate covalent
- (d) All of then

ETEA 2009

7. CO^2 is iso-structural with.....

- (a) HgCl_2
- (b) SnCl_2
- (c) C_2H_2
- (d) NO_2

8. Species in which the central atom uses sp hybrid orbital in its bonding is?

- (a) PH_3
- (b) NH^3
- (c) SbH_3
- (d) C_2H_2

ETEA 2010

9. The bond form between boron and hydrogen is.....

- (a) Ionic
- (b) Covalent
- (c) Coordinate covalent
- (d) None of the above

10. What causes a sharp increase in the energy with a further decrease in the distance between atoms A and B after bond formation?

- (a) Attraction of atoms A & B
- (b) Repulsion of nuclei of A and B and electrons of A & B
- (c) Attraction of nucleus of A and electron of B
- (d) Bond formation

11. During the formation of a chemical bond between two atoms the forces which are operative are:

- (a) Both forces of attraction and repulsion
- (b) Either force of attraction and repulsion
- (c) Only force of attraction
- (d) Only force of repulsion

ETEA 2012

12. Which of the following hybridization can explain the shape of BeCl_2 ?

- (a) SP^2 hybridization
- (b) SP hybridization
- (c) SP^3 hybridization
- (d) DSP^2 hybridization

13. How many sigma bonds are there in $CH^2=CH-CH=CH^2$?

- (a) 6 (b) 9 (c) 11 (d) 4

ETEA 2013

14. What is bond order in F_2 molecule according to the molecular orbital theory?

- (a) 2 (b) 3 (c) 1 (d) 4

15. Which one of the following compounds has the shortest carbon-halogen bond?

- (a) CH_3F (b) CH_3Cl
- (c) CH_3Br (d) CH_3I

16. Oxygen molecule has two unpaired electrons. It is therefore.

- (a) Ferromagnetic
- (b) Diamagnetic
- (c) Electromagnetic
- (d) Paramagnetic

17. The bond angle between H-C-C bonds in ethane are?

- (a) 109.5° (b) 120°
- (c) 90° (d) 107.5°

ETEA 2014

18. In which compound the bond angle is maximum?

- (a) Methane
- (b) Beryllium chloride
- (c) Ammonia
- (d) Boron trifluoride

ETEA 2015

19. Select molecule that has unpaired electrons in anti-bonding molecular orbitals.

- (a) N_2 (b) Cl_2 (c) H_2 (d) O_2
20. The shape of $SnCl_2$ is.
- (a) Linear
 - (b) Trigonal pyramidal
 - (c) Angular
 - (d) Trigonal planar

21. Which one of the following has zero bond order?

- (a) O_2 (b) He_2 (c) H_2 (d) N_2

ETEA 2016

22. Bond energy of covalent bond decreases with increase in.

- (a) Polarity
- (b) Multiplicity
- (c) Size of atom
- (d) All of the above

ETEA 2017

23. The existence of H_2^{2-} is not possible because.

- (a) It would be disproportion
- (b) It would be radio active
- (c) It violated the Pauli Exclusion Principle
- (d) No H-H bond would form

24. Considering the molecular orbital theory (MOT) choose the correct relative energies order.

- (a) $\sigma_{1s} < \sigma_{1s}^* < \sigma_{2s} < \sigma_{2s}^* < \sigma_{2p_x} < \pi_{2p_y} = \pi_{2p_z}$
- (b) $\sigma_{1s} < \sigma_{1s}^* < \sigma_{2s} < \sigma_{2s}^* < \pi_{2p_y} < \pi_{2p_z} < \pi_{2p_x}$
- (c) $\sigma_{1s} < \sigma_{1s}^* < \sigma_{2s} < \pi_{2p_x} = \pi_{2p_y} = \pi_{2p_z}$
- (d) $\sigma_{1s} < \sigma_{1s}^* < \sigma_{2s} < \sigma_{2s}^* < \pi_{2p_y} < \pi_{2p_z} < \pi_{2p_x}$

25. The bond energy of a H_2 molecule is:

- (a) 436 kJ/mol
- (b) 40.7 kJ/mol
- (c) 272 kJ/mol

(d) $236 \div$ Avogadro's no
26. Choose the molecule that could not be represented by single electronic structure formula:

- (a) CH_4 (b) H_2O (c) SO_2 (d) O_2

ETEA 2018

27. According to M.O theory the number of molecular orbitals in O_2 ...

- (a) 10 (b) 7 (c) 8 (d) 9

28. Unhybrid "P" orbitals on linear overlap.

- (a) Always form $\text{Pi}(\pi)$ bond
(b) Always form sigma(σ) bond
(c) Neither form " σ " nor " π " bond

(d) Form more reactive and more unstable " π " bond

29. Species with dipole moment equal to zero is.

- (a) AlCl_3 (b) CH_4
(c) 1,4-Dibromobenzene
(d) All of the above

30. If the overlap of sp^3 hybrid orbitals in carbon atoms is smaller the bond so formed is.

- (a) Weak (b) Strong
(c) Less energetic
(d) More stable

31. According to VSEPR theory, in which of the following molecules the electron pair geometry is pyramidal?

- (a) CH_4 (b) NH_3
(c) BF_3 (d) None of these

32. The orbital with highest energy is.

- (a) Hybrid (b) Unhybrid
(c) Molecular
(d) All are of equal energy

33. The bond angle in H_2S is less than H_2O . It is due to.....

- (a) Small size of oxygen atom
(b) Greater E.N of oxygen atom
(c) Oxygen contains two lone

pairs of electrons

(d) All of the above

34. In the compound CO_2 and H_2O the hybridization in oxygen is respectively.

- (a) sp^2 and sp^2
(b) sp^2 and sp^3
(c) sp^3 and sp^3
(d) sp^3 and sp^2

ETEA 2019

35. Which of the following species has the maximum number of unpaired electrons?

- (a) O^2 (b) O^{+2} (c) O^{+2} (d) O_2^{2-}

36. Which statement about the following molecules is incorrect?

- (a) NH_3 has pyramidal shape
(b) CO_2 is linear
(c) H_2O is angular
(d) H_2S is linear

37. The molecule having zero dipole moment among the following.....

- (a) NH_3 (b) SnCl_2
(c) PH_3 (d) CCl_4

38. A molecule which contains two lone pairs and two bond pairs of electrons in valence shell of central atom, geometrical shape of molecule will be.

- (a) Tetrahedral
(b) Angular
(c) Linear
(d) Trigonal pyramidal

ANSWER KEY

1.d	2.a	3.b	4.a	5.d	6.d
7.a	8.d	9.b	10.b	11.a	12.b
13.b	14.c	15.a	16.d	17.a	18.b
19.d	20.c	21.b	22.c	23.d	24.a
25.a	26.c	27.c	28.c	29.d	30.a
31.b	32.b	33.b	34.b	35.a	36.d
37.d	38.b				



- (b) Temperature, but not pressure or volume
- (c) Volume, but not pressure or temperature
- (d) Pressure and temperature but not volume

ETEA 2014

19. The Vander Waals equation of state for non-ideal gases differs from the ideal gas law in that it accounts for:

- (i) The mass of each molecule of the gas
- (ii) The volume of each molecule of the gas
- (iii) The attractive forces between molecules of the gas

- (a) I, II and III
- (b) I and II only
- (c) I and III only
- (d) II and III only

20. Which statement is wrong about the fourth state of matter is known as plasma?

(a) The plasma contains equal amount of positive and negative charges and are almost neutral as a whole.

(b) Plasma exists in the atmosphere of stars.

(c) Plasma exists in the region around the sun.

(d) There is less amount of matter in plasma state than the familiar, solid, liquid and gaseous states.

21. Equal volume of different gases under same condition of temperature

and pressure contain the same number of particles. The above statement is of:

- (a) Avogadro's law
- (b) Graham's law
- (c) Dalton's law
- (d) Hund's rule

ETEA 2015

22. If the absolute temperature of the gas is doubled and pressure is increased 4 times, then the volume becomes:

- (a) Half
- (b) Doubled
- (c) 4 times
- (d) Unchanged

23. Choose the correct order of the rate of diffusion of the given four gases?

- (a) $\text{CO} > \text{NO}_2 > \text{Cl}_2 > \text{SO}_2$
- (b) $\text{CO} > \text{SO}_2 > \text{NO}_2 > \text{Cl}_2$
- (c) $\text{CO} > \text{NO}_2 > \text{SO}_2 > \text{Cl}_2$
- (d) $\text{SO}_2 > \text{Cl}_2 > \text{CO} > \text{NO}_2$

24. Equal volume of CO and N_2 are taken in identical conditions, the correct relation between masses of two gases is:

- (a) $\text{CO} < \text{N}_2$
- (b) $\text{CO} > \text{N}_2$
- (c) $\text{CO} = \text{N}_2$
- (d) $\text{N}_2 < \text{CO}$

25. 800cm^3 of a gas at 400 torr pressure and 60°C was heated until the volume of gas become 3000cm^3 . The final temperature of the gas will be:

- (a) 832.5K
- (b) 559.5K
- (c) 1105.2K
- (d) 726.5K

26. A gaseous mixture contains 9.6% NH_3 , 22.6% N_2 and 67.8% H_2 gases. If the total pressure is 50 atm, then the partial pressure of

H₂ is:

- (a) $\frac{67.8 \times 100}{50}$
 (b) $\frac{50 \times 100}{67.8}$
 (c) $\frac{67.8 \times 50}{100}$
 (d) $\frac{67.8 + 50}{100}$

27. The critical temperature (T_c) of oxygen is:

- (a) -147.5°C (b) -183°C
 (c) -239.9°C (d) -118.8°C

ETEA 2016

28. Helium shows negative joule Thomson effect due to its:

- (a) Low viscosity
 (b) Inert nature
 (c) Resistance to polarize
 (d) Low density

29. A gas diffuses $\frac{1}{2}$ times as fast as hydrogen gas its molecular mass is:

- (a) 32amu (b) 25amu
 (c) 8amu (d) 16amu

30. A flask contains 6 gram of hydrogen gas and 64 gram oxygen at RTP the partial pressure of hydrogen gas in the flask of the total pressure (p) will be:

- (a) $\frac{2}{3}p$ (b) $\frac{3}{5}p$
 (c) $\frac{2}{5}p$ (d) $\frac{1}{3}p$

ETEA 2017

31. What is the relative rates of diffusion of equal volume (500 cm³) of hydrogen and oxygen under same condition of temperature and pressure?

- (a) 4:1 (b) 8:1
 (c) 16:1 (d) 2:1

32. A container is having mixture of gases, 20% ammonia, 30% hydrogen and 50% oxygen under 50 atm pressure choose the correct partial pressure respectively.

- (a) 10atm, 25atm, 15atm
 (b) 10atm, 15atm, 25atm
 (c) 25atm, 10atm, 15atm
 (d) 15atm, 25atm, 10atm

ETEA 2018

33. The charge on the electron and proton is reduced to half, the present value of Rydberg constant is R , then the new value will be:

- (a) $R/2$ (b) $R/4$
 (c) $R/8$ (d) $R/16$

34. Atmospheric pressure is measured by:

- (a) Hygrometer
 (b) Barometer
 (c) Pyrometer
 (d) Spherometer

35. The collision of the gas molecules with the wall of the container is responsible for gaseous pressure. According to Vander Waal (after pressure correction) which gas will exert more pressure if temperature is kept constant?

- (a) Real gas (b) Ideal gas
 (c) Non ideal gas
 (d) All will exert the same pressure

36. The equation used to describe the behavior of ideal gases under standard conditions is:

- (a) $PV = nRT$
 (b) $PM = dRT$
 (c) $PVM = mRT$
 (d) All of the above

37. When electric current is passed through neon gas it produces:

- (a) Plasma
 (b) Light
 (c) Plasma and light
 (d) Plasma, light & sound

38. An unknown gas diffuses 5 times slower than that of H_2 . The molecular mass of the unknown gas is:

- (a) 50 (b) 10
 (c) 15 (d) 25

ETEA 2019

39. A gas diffuses $\frac{1}{2}$ times as fast as hydrogen gas its molecular mass is:

- (a) 50amu (b) 25amu
 (c) 16amu (d) 8amu

40. The incorrect statement regarding gas having high value of coefficient of attraction:

- (a) Easy to be liquefied
 (b) Having higher critical temperature
 (c) Less soluble in water
 (d) None of the above

41. Pentane C_5H_{12} at room temperature does not obey:

- (a) Charles's law
 (b) Boyle's law
 (c) Avogadro's law
 (d) All of the above

42. Regarding liquefaction of gases, the highest critical temperature at a fixed pressure is of:

- (a) SO_3 (b) NH_3

- (c) Cl_2 (d) CO_2

43. For a gas when volume and pressure are $1dm^3$ and 2 atm respectively. What will be its new volume if the pressure is increased to 6 atm at constant temperature?

- (a) $\frac{1}{2} dm^3$ (b) $\frac{1}{3} dm^3$
 (c) $\frac{1}{4} dm^3$ (d) $\frac{2}{3} dm^3$

44. Which of the following gases has the highest rate of diffusion at the same temperature and pressure?

- (a) HCl (b) CO_2
 (c) C_2H_2 (d) C_2H_6

ANSWER KEY

1.a	2.b	3.d	4.d	5.a	6.c
7.b	8.c	9.d	10.c	11.a	12.d
13.d	14.b	15.c	16.b	17.b	18.b
19.d	20.d	21.a	22.a	23.c	24.c
25.a	26.c	27.d	28.c	29.c	30.b
31.a	32.b	33.d	34.b	35.b	36.d
37.c	38.a	39.d	40.c	41.d	42.a
43.b	44.c				



CHAPTER # 5**ETEA 2007**

1. Distillation under reduced pressure is used to purify liquids which:
- (a) are explosive
 - (b) are highly volatile
 - (c) Decompose at their boiling point
 - (d) Have high boiling point

ETEA 2008

2. London dispersion forces [forces between the particles] are present in:
- (a) Gases only
 - (b) Liquids only
 - (c) Solids only
 - (d) All of the above.
3. Evaporation occurs at:
- (a) All
 - (b) Low temperature
 - (c) High temperature
 - (d) Absolute temperature

ETEA 2009

4. Cleaning action of soap is due to:
- (a) Decrease in surface tension of water
 - (b) Viscosity of water
 - (c) High boiling points of water
 - (d) Polarity of water
5. What type of intermolecular attractive force are present in CO_2 ?
- (a) Hydrogen bonding
 - (b) Dipole-dipole interaction
 - (c) London forces
 - (d) Covalent bonding

ETEA 2012

6. In which of the following compounds hydrogen bonding is possible?
- (a) PH_3 (b) CH_4 (c) NH_3 (d) SiH_4
7. Choose the compound in which

hydrogen bonding is not possible?

- (a) CH_3OCH_3 (b) H_2O
(c) $\text{CH}_3\text{CH}_2\text{OH}$ (d) CH_3COOH
8. Which is true about London forces?

- (a) London forces are present in non-polar molecules
- (b) London forces are present in polar molecules
- (c) London forces are created between instantaneous and induced dipole
- (d) All of the above

ETEA 2013

9. Vapour pressure of a liquid can be measured by the barometric method and manometric...

- (a) Barometric method is more accurate than manometric method
- (b) Manometric method is more accurate than barometric method.
- (c) Both are equally accurate and applicable
- (d) Both methods are in use but are not reliable

10. Liquids crystalline substance are used to locate tumors in the body because:

- (a) These parts of the body are warmer than the surroundings
- (b) These parts of the body are cooler than the surroundings
- (c) These parts of the body are constantly increasing and decreasing with the temp.
- (d) None of the above

11. Choose the compound in which hydrogen bonding is not possible?

- (a) H_2O (b) HCl
(c) CH_3COOH (d) $\text{CH}_3\text{CH}_2\text{OH}$

12. Hydrogen bonding do not exist in the molecule of:

- (a) Hydrogen (b) Proteins
(c) Carbohydrates
(d) Ammonia

ETEA 2015

13. London dispersion forces are stronger in:

- (a) Br_2 (b) I_2 (c) F_2 (d) Cl_2

14. Atomic size of xenon is larger than neon. Considering the London dispersion force which one of the following is true?

- (a) Neon molecules have weaker London dispersion forces
(b) Xenon molecules have weaker London dispersion forces
(c) Xenon and neon have almost same London dispersion forces
(d) Xenon have lower boiling point than neon

15. Earthen pots keep water cool in hot summer due to:

- (a) Capillary action
(b) Surface tension
(c) Evaporation
(d) Combined effect of A & B

16. The heat of vaporization of the liquid A, B and C are 60, 30 and 40 cal/mole respectively the order of decreasing intermolecular forces among their molecules is:

- (a) $A > B > C$ (b) $C > B > A$
(c) $A > C > B$ (d) $B > C > A$

ETEA 2018

17. Compound with a greater number of hydrogen bonding is:

- (a) CH_3OH (b) H_2O
(c) HF (d) H_2SO_4

18. The liquid with highest rate of evaporation among the following is:

- (a) Water (b) Ethyl alcohol
(c) Ammonia (d) n-pentane

19. Bonding in H-F is stronger than H_2O and NH_3 . The highest boiling point among the three is of:

- (a) HF (b) NH_3 (c) H_2O
(d) All have same boiling point

20. Evaporation depends upon:

- (a) Surface area
(b) Temperature
(c) Both (a) & (b)
(d) None

ETEA 2019

21. Which one of the following liquids is more volatile?

- (a) Chloroform (b) Effluent
(c) Water (d) Glycerin

22. Vapour pressure of a liquid does not depend on:

- (a) Temperature
(b) Intermolecular forces
(c) Amount of liquid
(d) Amount of solid dissolved in the liquid

23. In ice the water molecules are bonded by:

- (a) Ionic bonds
(b) Hydrogen bonds
(c) Covalent bonds
(d) Metallic bonds

24. At high altitude the boiling point of water is less than 100°C , this is because of:

- (a) High atmospheric pressure
(b) Weak hydrogen bonding
(c) No change in atmospheric pressure
(d) Lower atmospheric pressure

ANSWER KEY

1.c	2.d	3.a	4.a	5.c	6.c
7.a	8.d	9.b	10.a	11.b	12.a
13.b	14.a	15.d	16.c	17.d	18.d
19.c	20.c	21.a	22.c	23.b	24.d



CHAPTER # 6

ETEA 2007

1. The existence of a substance is more than one solid modification is known as:

- (a) Isomorphism
- (b) Amorphism
- (c) Polymorphism
- (d) None

ETEA 2008

2. The type of intermolecular forces [forces between the particles] present in solid mercury is:

- (a) Covalent bond
- (b) Ionic bond
- (c) Metallic bond
- (d) H-bond

3. The electrical conductivity of NaCl crystal is:

- (a) More than NaBr crystal
- (b) Less than NaBr crystal
- (c) Equal to NaBr crystal
- (d) NaCl crystal doesn't conduct electric current

ETEA 2009

4. The shape of appearance in which a crystal grows is called:

- (a) Crystal geometry
- (b) Crystal lattice
- (c) Crystal habit
- (d) None of these

ETEA 2010

5. Which one of the following characteristic is not usually attributed

to ionic substances?

- (a) High melting points
- (b) Deform when struck
- (c) Fragility
- (d) Crystalline

ETEA 2011

6. Choose the region of the spectrum which would be used to determine the structure of crystalline solids?

- (a) Visible
- (b) Infrared
- (c) X-rays
- (d) Ultraviolet

7. KNO_3 exists in two crystalline forms rhombohedral and orthorhombic the phenomenon is known as:

- (a) Polymorphism
- (b) Isomorphism
- (c) Allotropy
- (d) None of these

ETEA 2012

8. Choose the correct statement:

- (a) Crystalline solids are usually anisotropic but liquid crystals are isotropic
- (b) Crystalline solids are usually isotropic but liquid crystals are anisotropic
- (c) Liquid crystals have both isotropic and anisotropic properties
- (d) Liquid crystals are devoid of isotropic and anisotropic properties

9. Choose the correct statement:

- (a) Ionic solids exist in the form of molecules
- (b) Ionic solids have high volatility

- (c) Ionic solids exist in the form of liquids
(d) Ionic solids have high melting points and boiling points

ETEA 2014

10. Which is incorrect statement?
(a) The ionic bonds are non-directional in character.
(b) The crystal of covalent compounds are made up of molecules.
(c) The covalent bonds are rigid and non-directional.
(d) Ionic compounds have high melting points.

11. Sodium chloride crystal structure is:
(a) Hexagonal
(b) Body centered cubic
(c) Face centered cubic
(d) Tetragonal

12. Both NaNO_3 and CaCO_3 crystallize in rhombohedral forms therefore they are:

- (a) Allotropes
(b) Polymorphous
(c) Isomorphous
(d) None of these

ETEA 2016

13. Graphite is one of the allotropic forms of carbon it is:

- (a) Isotropic
(b) Anisotropic
(c) Bad conductor of electricity
(d) Both (b) & (c)

ETEA 2017

14. Amorphous solids are made by

fusing silicates with:

- (a) Baric oxide
(b) Aluminum oxide
(c) Phosphorous pentoxide
(d) All of the above

15. Choose the anisotropic behavior:

- (a) Coefficient of thermal expansion
(b) Lattice energy
(c) Viscosity
(d) Infrared spectroscopy

16. The compound with most exothermic lattice energy is:

- (a) CaCl_2 (b) K_2O
(c) CaO (d) BaCl_2

ETEA 2018

17. All are anisotropic at room temperature except:

- (a) CCl_4 (b) AgNO_3
(c) CdS (d) BaCO_3

18. At a temperature -10°C which one doesn't behave the property of molecular crystal among the following is:

- (a) Phosphorous (b) Water
(c) Sucrose
(d) None of these

19. The melting point of a crystalline solid by the addition of impurities:

- (a) Increases (b) Decreases
(c) Remains the same
(d) 1st decreases than decreases

ETEA 2019

20. In ice there are H-bonds and covalent bonds. What type of solid is it?

- (a) Ionic (b) Covalent

(c) Molecular (d) Metallic
21. The property of crystalline solid necessary to maintain habit of crystal is called:

- (a) Crystal lattice
(b) Lattice site
(c) Geometrical shape
(d) Polymorphism
22. Diamond and graphite are:
(a) Isomers (b) Isomorphs
(c) Allotropes
(d) Both (b) & (c)
23. Substance that has sharp melting point in the following is:
(a) Gemstone (b) Coal tar
(c) Glass (d) Diamond

ANSWER KEY

1.c	2.c	3.d	4.c	5.c	6.c
7.a	8.a	9.d	10.c	11.c	12.c
13.b	14.d	15.a	16.c	17.a	18.d
19.b	20.c	21.c	22.c	23.d	

○○○

CHAPTER # 7

ETEA 2005

1. In the given exothermic reaction

$$\text{PCl}_{3(g)} + \text{Cl}_{2(g)} \rightarrow \text{PCl}_{5(g)}$$
 an increased in yield will favoured by:
 (a) Decrease of temperature
 (b) Increase of temperature
 (c) Keeping temp. constant
 (d) None of these

ETEA 2006

2. For a reversible reaction to reach equilibrium state the reaction carried out in:
 (a) Glass vessel
 (b) Iron vessel
 (c) Open vessel
 (d) Closed vessel
3. The unit of K_c for the system

$$\text{N}_2\text{O}_4 \rightleftharpoons 2\text{NO}_2$$
 is:
 (a) Dimensionless [with no unit]
 (b) Mole dm^3
 (c) Mole dm^{-3}
 (d) Mole² dm^3

ETEA 2007

4. $\text{H}_2 + \text{I}_2 \rightleftharpoons 2\text{HI}$ this reaction is not effected by:
 (a) Volume (b) Pressure
 (c) Temperature (d) pH
5. The equilibrium constant for a reaction

$$\text{N}_{2(g)} + \text{O}_{2(g)} \rightarrow 2\text{NO}_{(g)}$$
 is 4×10^{-4} at 2000K. In the presence of catalyst, the equilibrium constant is presence of catalyst at 200K is:
 (a) 10×10^{-4} (b) 4×10^{-4}

Chemistry - 1st Year

(c) 40×10^{-4} (d) 4×10^{-2}

6. If K_c is small, it indicates that the equilibrium occurs:

- (a) At a low product concn.
- (b) Only with the help of catalyst
- (c) At a high product concn.
- (d) None of these

ETEA 2008

7. Consider the reaction $2SO_2 + O_2 \rightleftharpoons 2SO_3 + \text{heat}$ the yield of SO_3 will be maximum if:

- (a) Both pressure and temperature are increase
- (b) Both pressure and temperature are decrease
- (c) Temperature is decreased and pressure is increased
- (d) Temperature is decreased and pressure is decreased

8. For reaction $3O_{2(g)} \rightleftharpoons 2O_{3(g)}$ $K_c = 10^{-56}$ at $25^\circ C$ one can predict:

- (a) More O_3 is formed
- (b) More reactants are consumed
- (c) The forward reaction progress to a large extent
- (d) The backward reaction goes to near completion

ETEA 2009

9. When does a chemical reaction attain equilibrium?

- (a) When forward and backward reaction taking place at the same rate
- (b) Reaction takes place
- (c) The forward and backward

(d) There are two reactions with one faster than the other

10. The value of K_c [equilibrium constant] for a reaction?

- (a) is the same at different temperature
- (b) is different, at different temperature
- (c) is negligible at room temperature
- (d) Can be the same at different temperature

ETEA 2010

11. A reaction between CO and H_2O is $CO_{(g)} + H_2O \rightarrow CO_{2(g)} + H_2$ the unit of equilibrium for this reaction is:

- (a) Mol/liter
- (b) Liter/mol
- (c) Dimensionless
- (d) Mol/cm^3

12. Consider chemical reaction $2Cl_{(g)} \rightleftharpoons Cl_{2(g)}$, the extent of completing this reaction depends upon the magnitude of K_c and shows that the equilibrium mixture will consist almost of Cl molecules when:

- (a) K_c is very large
- (b) K_c is very small
- (c) K_c is neither very small nor very large
- (d) K_c is equal to 1

ETEA 2012

13. Forces controlling the reaction are proportional to the product of the active masses [concentration] of chemicals. The above statement is of:

- (a) Rault's law
- (b) Le-Chatlier's principle

(c) The law of conservation of energy

(d) Law of mass action

14. Common salt is purified by common ion effect by passing HCl gas through saturated solution of NaCl in water. Why ordinary crystallization process from saturated solution is not recommended?

(a) Common salt solubility remains constant with increase in temperature.

(b) Common salt is less soluble in water.

(c) Common salt solubility in water increases with increase in temperature.

(d) Common salt solubility decreases with increase in temperature.

15. If K_c of a certain reaction is large it indicates that at equilibrium

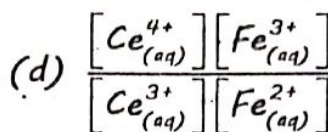
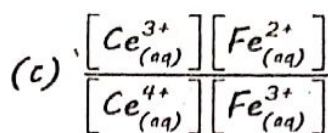
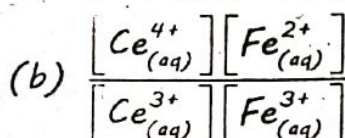
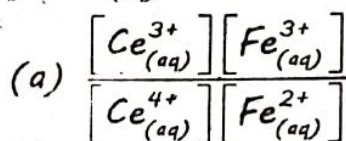
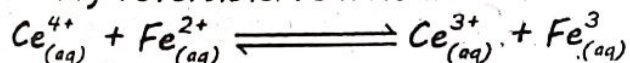
(a) The reactants concentration will be high

(b) The product concentration will be low

(c) The product concentration will be high

(d) The reactant and product concentration will be equal

16. Select the correct equilibrium constant expression K_c for the following reversible reaction...



17. Consider the following endothermic reaction: $\text{N}_{2(g)} + \text{O}_{2(g)} \rightleftharpoons 2\text{NO}_{(g)}$

What will happen to the equilibrium if the temperature of the system is raised?

(a) The equilibrium will shift in the backward

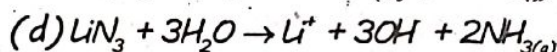
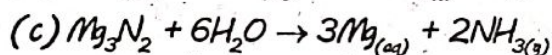
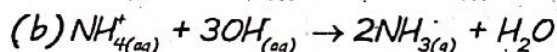
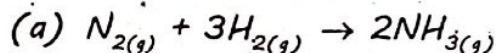
(b) The equilibrium position will suffer no change

(c) The equilibrium will shift to forward direction

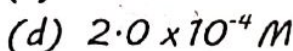
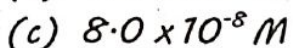
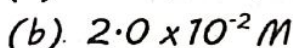
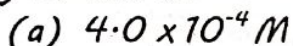
(d) All of the above

ETEA 2013

18. Which one of the following best represents the Haber process of the production of ammonia?



19. A salt AB ionizes as $\text{AB} \rightleftharpoons \text{A}^+ + \text{B}^-$ the solubility product of salt AB is 4×10^{-4} , the molar solubility of salt is:

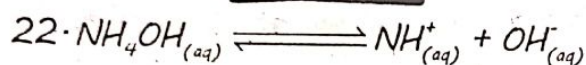


ETEA 2014

20. Guldberg and Waage stated:

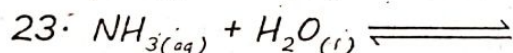
(a) Acid base equilibria

- (b) Periodic law
 (c) Law of mass action
 (d) Rule of multiplicity
21. Purification of common salt by passing HCl gas is based on:
- (a) Volatility
 (b) Common ion effect
 (c) Ionization
 (d) None of these

ETEA 2015

Consider the above ionization, ammonium chloride is added to the system. Select the correct statement.

- (a) The equilibrium will shift to the right.
 (b) The equilibrium will shift to the left.
 (c) The equilibrium will remain undisturbed.
 (d) The equilibrium will be attained quickly.



$\text{NH}_4^+_{(aq)} + \text{OH}^-_{(aq)}$. Calculate the ionization constant of the above equation if $[\text{NH}_4^+]$ is 10^{-5}M , $[\text{NH}_3]$ is 1.0M and $[\text{OH}^-]$ is 0.15M .

- (a) 1.5×10^{-5} (b) 1.5×10^{-6}
 (c) 1.5×10^{-4} (d) 1.0×10^{-6}

ETEA 2016

24. Excess of BaSO_4 was dissolved in pure water at 25°C . If its $K_{sp} = 1 \times 10^{-10}$ what is the conc. of Ba^{2+} ions in water?

- (a) $K_p = K_c$ (b) $K_p < K_c$
 (c) $K_p > K_c$ (d) $K_p < 0$

ETEA 2017

26. Excess of Ag_2CrO_4 was dissolved in distilled water its solubility was found to be $1.3 \times 10^{-4} \text{ mol dm}^{-3}$ what is the solubility product?

- (a) $K_{sp} = [1.3 \times 10^{-4}]^2 [1.3 \times 10^{-4}]$
 (b) $K_{sp} = [2.6 \times 10^{-4}]^2 [1.3 \times 10^{-4}]$
 (c) $K_{sp} = [1.3 \times 10^{-8}] [1.3 \times 10^{-4}]$
 (d) $K_{sp} = [1.3 \times 10^{-8}]^2 [1.3 \times 10^{-4}]^2$

27. Consider the following reaction
 $\text{PCl}_{5(g)} \rightleftharpoons \text{PCl}_{3(g)} + \text{Cl}_{2(g)}$

When K_p at 500K is 0.85 , what will be the value of K_c at the same temperature?

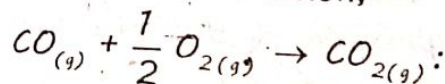
- (a) $K_c = \frac{0.85}{0.082 \times 500}$
 (b) $K_c = \frac{0.82}{0.85 \times 500}$
 (c) $K_c = \frac{0.85 \times 500}{0.82}$
 (d) $K_c = \frac{0.85}{0.82}$

ETEA 2018

28. The solubility of AgCr_2O_7 at 25°C was $2.0 \times 10^{-5}\text{M}$. K_{sp} value is:

- (a) 3.2×10^{-14} (b) 4.0×10^{-10}
 (c) 8.0×10^{-25} (d) 8.0×10^{-10}

29. For the reaction,



- (a) $K_p > K_c$ (b) $K_p < K_c$
 (c) $K_p = K_c$ (d) $K_p \geq K_c$

30. Initially one mole each N_2 and O_2 were made to react as, $\text{N}_2 + \text{O}_2 \rightleftharpoons 2\text{NO}$ if at equilibrium 0.25 moles of O_2 is present, the equilibrium concentration of NO will be:

- (a) 0.50 moles (b) 0.125 moles
(c) 1.50 moles (d) 1.75 moles

31. Which reaction do you think has highest value of K_c ?

- (a) $H_2 + I_2 \rightleftharpoons 2HI$
(b) Ester + Water $\rightleftharpoons$ Acid + Alcohol
(c) $Cl + Cl \rightleftharpoons Cl_2$
(d) $C + 2H_2 \rightleftharpoons CH_4$

32. Students were heating $CaCO_3$ in an open container to produce CO_2 gas, $CaCO_{3(s)} \rightleftharpoons CaO_{(s)} + CO_{2(g)}$. If we increase pressure on this system the:

- (a) Equilibrium will shift towards right.
(b) Equilibrium will shift towards left.
(c) Equilibrium will not be disturbed.
(d) System does not obey equilibrium rules.

33. Aqueous solution of KBr is added to the aqueous solution of $MgBr_2$. Due to common Br^- ions equilibrium is disturbed. To reach the state of new equilibrium which reaction will occur?

- (a) $K_{aq}^+ + Br_{aq}^- \rightleftharpoons KBr_{(s)}$
(b) $Mg_{aq}^{++} + 2Br_{aq}^- \rightleftharpoons MgBr_{2(s)}$
(c) Both are possible
(d) Common ion effect is not applicable to this system

34. If the equilibrium constant K_c value for a certain reaction is very small, then:

- (a) Reactants are in large amount
(b) Products are in appreciable amount

- (c) Reactants and products both are in appreciable amount
(d) In such a situation equilibrium cannot be obtained

35. When NH_4Cl is added to a solution of $(NH_4)_2CO_3$, there will be:

- (a) Decrease in NH_4^+ ions concentration
(b) Decrease in CO_3^{2-} ions concentration
(c) No change in CO_3^{2-} ions concentration
(d) No change in concentration of any species

36. Ice and water is in equilibrium with each other increasing the pressure the equilibrium will shift in:

- (a) Forward (b) Reverse
(c) To all system at equilibrium
(d) None of the above

37. Consider the reversible reaction, $N_2 + 3H_2 \rightleftharpoons 2NH_3 + \text{Heat}$,

The yield of NH_3 will be maximum at:

- (a) High temp. & low pressure
(b) High temp. & high pressure
(c) Low temp. & low pressure
(d) Low temp. & high pressure

ANSWER KEY

1.a	2.d	3.c	4.b	5.b	6.a
7.c	8.d	9.a	10.b	11.c	12.a
13.d	14.a	15.c	16.a	17.c	18.a
19.b	20.c	21.b	22.b	23.b	24.c
25.b	26.b	27.a	28.a	29.b	30.c
31.c	32.d	33.d	34.a	35.b	36.a
37.d					



CHAPTER # 8

ETEA 2006

1. Which one of the following acids has the highest pH value?

- (a) $\text{HCl}_{(aq)}$ (b) $\text{HNO}_{3(aq)}$
(c) $\text{HF}_{(aq)}$ (d) $\text{H}_2\text{SO}_{4(aq)}$

2. Compounds which tend to donate electron pair are known as Lewis bases or nucleophiles. Which one of the following is not a Lewis base?

- (a) $\text{CH}_3\text{-NH}_2$ (b) PH_3
(c) AlCl_3 (d) H_2O

ETEA 2010

3. According to the Bronstead lowery concept which of the following species cannot function as an acid?

- (a) SO_4^{2-} (b) H_3O^+
(c) HSO_4^- (d) NH_4^+

4. Which of the following ions can act as a Bronstead acid and base in water?

- (a) HCO_3^- (b) CN^-
(c) NO_3^- (d) PO_4^{3-}

5. The value of ionic product K_w are 0.64×10^{-14} at 18°C , 1×10^{-14} at 25°C from this may be derived that:

- (a) Endothermic process
(b) Exothermic process
(c) Vaporization process
(d) Change of H_2O into O_2 & H_2

ETEA 2012

6. AlCl_3 generally behaves as:

- (a) Lewis acid
(b) Bronstead base
(c) Bronstead acid

(d) Lewis base

ETEA 2013

7. The smaller the value of pK_b :

- (a) The weaker the base
(b) The stronger the base
(c) The stronger the acid
(d) None of the above

ETEA 2014

8. An acid is a substance which accepts:

- (a) An electron pair
(b) Proton
(c) An electron
(d) Pair of proton

ETEA 2015

9. Which of the following ions can act both as Bronstead acid and base in solvent water?

- (a) CN^- (b) SO_4^{2-}
(c) HCO_3^- (d) PO_4^{3-}

10. The proton acceptor is:

- (a) NH_3 (b) BF_3
(c) HCl (d) H^+

11. The aqueous solution of which one of the following compounds maintain its pH constant?

- (a) CH_3COOH and $(\text{NH}_4)_2\text{SO}_4$
(b) NH_4NO_3 and KNO_3
(c) NH_4OH and NH_4Cl
(d) NH_4OH and NaCl

12. Which of the following acid has a strong conjugate base?

- (a) CH_3COOH (b) HCl
(c) HNO_3 (d) H_2SO_4

13. The pH of 0.001M aqueous solution of NaOH is:

- (a) 6 (b) 13
(c) 11 (d) 12

ETEA 2016

14. pK_a values of some acids are given below. Choose the weaker acid.

- (a) $HClO_4$ (-10) (b) HBr (-9)
(c) H_2SO_4 (-3) (d) HCl (-7)

15. What is the concentration moles/litre of nitric acid solution having pH of 4?

- (a) 4 (b) -4
(c) 10^{-4} (d) 10^{-10}

16. Pick up the Arrhenius acid or base

- (a) BF_3 (b) NH_3
(c) $AlCl_3$ (d) None

ETEA 2017

17. Choose acids that are showing leveling effect:

- (i) HCl (ii) HI (iii) HCl (iv) HF
(a) i and iv (b) i, iii and iv
(c) iii and iv (d) i, ii and iii

18. A solution 0.1M in H_2CO_3 and 0.1M in $NaHCO_3$ is made. The pH of the resulting solution should be closest to:

[Note: H_2CO_3 $pK_a = 6.37$]

- (a) 6.37 (b) 4.35
(c) 6.28 (d) 7.37

19. Which of the following is an acid?

- (a) OH^- (b) PH_3
(c) HCO_3^- (d) SO_4^{2-}

ETEA 2018

20. If the pH of the solution is 9, its OH^- ions concentration is:

- (a) 10^{-5} (b) 5
(c) 10^{-9} (d) 9

21. The specie with a strong conjugate base in aqueous solution among the following is:

- (a) HI (b) HNO_3
(c) CH_3COOH (d) $HClO_4$

22. Choose the one that cannot form buffer system:

- (a) KH_2PO_4 / H_3PO_4
(b) $NaClO_4 / HClO_4$
(c) CH_3COOH / CH_3COONa
(d) NH_4OH / NH_4Cl

23. Henderson-Hasselbalch equation is used to calculate the pH of a buffer solution. The correct representation of the equation is:

- (a) $pK_a - \log[\text{Salt}] / [\text{Acid}]$
(b) $pK_a \times \log[\text{Acid}] / [\text{Salt}]$
(c) $K_a + \log[\text{Salt}] / [\text{Acid}]$
(d) $pK_a + \log[\text{Salt}] / [\text{Acid}]$

ETEA 2019

24. Why ethanoic acid is a stronger acid in the liquid ammonia than in water?

- (a) Ammonia is stronger base than in water.
(b) Ethanoic acid molecules form H-bonding with water.
(c) Ethanoic acid is more soluble in liquid ammonia than in water.
(d) None of the above

25. Which one of the following form acidic solution when dissolved in water?

- (a) Na_2CO_3
(b) CH_3COONa
(c) NH_4Cl
(d) $FeCO_3$

26. The strongest base among the following is:

- (a) Cl^- (b) Br^-
(c) I^- (d) CH_3COO^-

27. When ammonium cyanide $[\text{NH}_4\text{CN}]$ salt is dissolved in water, the solution will be:

- (a) Neutral
(b) Acidic
(c) Basic
(d) Both (b) & (c)

ANSWER KEY

1.c	2.c	3.a	4.a	5.a	6.a
7.b	8.a	9.c	10.a	11.c	12.a
13.c	14.c	15.c	16.d	17.d	18.a
19.c	20.a	21.c	22.b	23.d	24.a
25.c	26.d	27.c			



CHAPTER # 9

ETEA 2008

1. For which reaction of the unit of rate constant "K" is the same as that of the reaction rate?

- (a) Zero order
(b) First order
(c) Second order
(d) Third order

2. Consider the following general reaction $\text{1A} + \text{1B} \rightarrow \text{products}$
Rate of reaction is expressed as rate = $k[\text{A}]^1 [\text{B}]^1$ the correct order of reaction and molecularity is:

- (a) 2:2 (b) 2:3
(c) 3:2 (d) 3:3

3. Which of the following is correct?

- (a) Molecularity of a reaction is same as the order of reaction
(b) In some cases molecularity of a reaction is the same as order of reaction
(c) Molecularity of a reaction is more than order of reaction
(d) All are correct

ETEA 2009

4. The unit of 1st order rate constant is:

- (a) Sec (b) Sec^{-1}
(c) $\text{Mol} \cdot \text{dm}^{-3} \cdot \text{sec}^{-1}$
(d) None of above

5. A catalyst is more effective when it is in the finely divided state because:

- (a) The valence electrons are easily available

- (b) This increases the surface area of the catalyst
- (c) It attains equilibrium quickly
- (d) All of the above

ETEA 2010

6. The rate of reaction is defined as
- (a) dc/dt (b) dt/dc
 - (c) $dc \cdot dt$ (d) $(dc)^2/(dt)^2$

ETEA 2012

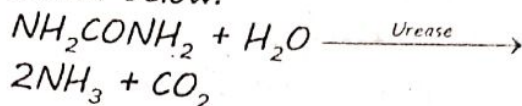
7. The rate law for the reaction $A \rightarrow C$, $\text{Rate} = K[A]$ the unit of K will be:
- (a) $\text{Mole}^{-1}\text{dm}^3\text{s}^{-1}$
 - (b) $\text{Mole}^1\text{dm}^{-3}\text{s}^{-1}$
 - (c) s^{-1}
 - (d) $\text{Mole}^{-1}\text{dm}^3$
8. The chemical method used for the determination of reaction rate:
- (a) Conductometry
 - (b) Polarimetry
 - (c) pH metry
 - (d) Volumetric analysis
9. The order of chemical reaction can be measured by:
- (a) Half life method
 - (b) Differential method
 - (c) Ostwald method
 - (d) All of these

ETEA 2013

10. The addition of a catalyst to a chemical reaction changes:
- (a) The enthalpy
 - (b) The entropy
 - (c) The activation energy
 - (d) The free energy

ETEA 2014

11. The hydrolysis of urea into ammonia and CO_2 takes place in the presence of a catalyst urease as shown below:



The type of above catalysis is:

- (a) Homogenous catalysis
- (b) Heterogeneous catalysis
- (c) Enzyme catalysis
- (d) None of these

ETEA 2015

12. Choose the one which is not the assumption of collision theory of reaction rate:
- (a) For chemical reaction to occur molecule/particles must collide
 - (b) For reacting molecules/ particles must possess a certain minimum amount of energy, the activation of energy.
 - (c) Every collision is not productive.
 - (d) For hydrogen molecule formation from atoms require specific orientation
13. Consider the following reaction
- $$A + B + C \longrightarrow M + N + O$$
- The fact enthalpy of $M + N + O$ is higher than that of $A + B + C$ indicates that:
- (a) The reaction is exothermic
 - (b) The reaction is endothermic
 - (c) Catalyst for the reaction is

unnecessary

- (d) The activation energy required for the reverse reaction is higher than for the forward reaction

14. The number of colliding molecules of different gases calculated from kinetic molecular theory per liter per second at standard condition is the order of magnitude of:

- (a) 10^{23} (b) 10^{29}
(c) 10^{32} (d) 10^4

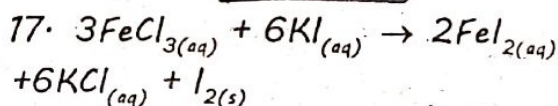
15. The rate law equation for reaction is given as $\frac{dx}{dt} = K[FeCl_3]^1 [KI]^2$ the reaction is:

- (a) First order
(b) Second order
(c) Third order
(d) Pseudo first order

16. A zero order reaction is one whose rate is independent of:

- (a) Temperature of reaction
(b) Concentration of reactants
(c) Concentration of products
(d) Material of the vessel in which the reaction is carried out

ETEA 2017



Rate = $K[FeCl_3]^1 [KI]^2$ choose the correct molecularity and order of the reaction respectively.

- (a) 2 and 2 (b) 6 and 2
(c) 8 and 3 (d) 8 and 2

ETEA 2018

18. In a transition state the reactant are:

- (a) High stable
(b) Moderately stable
(c) Highly unstable
(d) In low energy state

19. The main difference between catalysis and enzymes is:

- (a) Enzymes are sharp in action than catalyst
(b) Catalysts used in large amount than enzymes
(c) Catalysts are inorganic while enzymes are organic in nature
(d) Enzymes need pH while catalysis do not

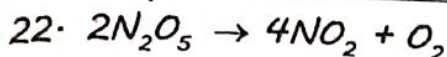
20. The minimum energy below which no reaction occurs in reactants molecules is:

- (a) Average K.E of the molecules
(b) Potential energy of the molecules
(c) Free energy of the molecules
(d) Activation energy of the molecules

ETEA 2019

21. For a reversible reaction, the catalyst increases the speed of:

- (a) Forward reaction
(b) Backward reaction
(c) Both forward and backward reactions equality
(d) Forward reaction to larger extent than backward reaction



This reaction is an example of..... order reaction.

- (a) 1st (b) 2nd
(c) 3rd (d) Zero

23. For exothermic reversible reaction activation energy for forward direction depends upon:

- (a) Temperature
(b) Nature of reactant
(c) Nature of product
(d) Both (a) & (b)

ANSWER KEY

1.a	2.a	3.b	4.b	5.b	6.a
7.c	8.d	9.d	10.c	11.c	12.d
13.b	14.c	15.c	16.b	17.c	18.c
19.c	20.d	21.c	22.a	23.b	



CHAPTER # 10

ETEA 2005

1. A solution of 2.0g NaOH dissolved in 1000g of water has the following concentration:

- (a) 0.50m (b) 0.05M
(c) 0.05N (d) 0.05m

2. 50cm³ of KOH solution was titrated against 1.0M HCl using phenolphthalein as an indicator. The acid used was found to be 7.5cm³. The concentration of KOH solution is:

- (a) 0.15 (b) 1.5
(c) 0.75 (d) none

ETEA 2006

3. The lowering in vapour pressure is the highest for:

- (a) 0.34molal (b) 0.25molal
(c) 2 molal (d) 0.02molal

ETEA 2007

4. The 2% solution by weight of sodium chloride solution is prepared. The molality of this solution is:

- (a) 0.34molal (b) 0.25molal
(c) 2 molal (d) 0.02molal

ETEA 2008

5. Two what volume in..... must 50.0ml of 3.50M H₂SO₄ be diluted in order to make 2M H₂SO₄?

- (a) 25 (b) 60.1
(c) 87.5 (d) 93.2

ETEA 2010

6. 10ml of 1.5M NaOH solution is

neutralized by 20ml of a M HCl solution. The value of M HCl will be:

- (a) 1.0 (b) 0.75
(c) 0.5 (d) 0.25

7. 2.3g of ethanol (C_2H_5OH) is added to 500g of water, determine the molality of the resulting solution.

- (a) 0.01molal (b) 0.1molal
(c) 1.1molal (d) 1.0molal

8. Water has a vapour pressure of 23.75 torr at $25^\circ C$, what is the vapour pressure of solution sucrose if its mole fraction is 0.25?

- (a) 15.2 torr (b) 17.8 torr
(c) 23.8 torr (d) 29.7 torr

ETEA 2011

9. 0.1000 mole of NaCl was dissolved in $1.000dm^3$ distilled water at 298K. The concentration of resulting solution is:

- (a) 5.85M (b) 1.00M
(c) 0.1000M (d) <0.1000M

10. The vapour pressure of pure acetone is 347mmHg. A mixture of 58.0g acetone and 2.0g of water is made according to Rault's law. What is the partial pressure of the acetone in this mixture?

- (a) 382mmHg
(b) 298mmHg
(c) 242mmHg
(d) 312mmHg

11. Pure water of freezes at $0^\circ C$ and boils at $100^\circ C$ at standard conditions. Calcium chloride was added to pure water, what do you expect about its freezing point boiling point?

- (a) No change in its freezing

point and boiling point

- (b) Freezing point increases and boiling point decreases
(c) Freezing point increases and boiling point increases
(d) Freezing point decreases and boiling point increases

12. The solubility of solute depends on:

- (a) Temperature of solution
(b) Quantity of solvent
(c) Quantity of solute
(d) All the three choices

ETEA 2012

13. The solution formation of two miscible liquids perfectly obey the Rault's law if they satisfy the conditions:

- (a) $\Delta H = 1, \Delta V = 1$
(b) $\Delta H = 1, \Delta V = 0$
(c) $\Delta H = 1, \Delta V = 1$
(d) $\Delta H = 0, \Delta V = 0$

ETEA 2013

14. If $20.0cm^3$ of 0.5M solution is diluted to $1.0dm^3$. What will be its new concentration?

- (a) 0.001m (b) 0.01m
(c) 1.0m (d) 10.0m

ETEA 2015

15. 18.0g of glucose is dissolved in 100g of solvent water the molality of the resultant solution is:

- (a) 0.01m (b) 0.1m
(c) 1.0m (d) 10.0m

16. A water sample contains $3.8 \times 10^{-2}g$ of mercury per kilogram of the sample. What is the concentration

of mercury in parts per million?

- (a) 3.8ppm (b) 38ppm
(c) 0.38ppm (d) 380ppm

17. Nayab in laboratory dissolves 4g of NOH in 250mL of water. The molality of this solution is:

- (a) 0.4m (b) 4m
(c) 0.2m (d) 0.1m

ETEA 2016

18. Which of the following solution will have high osmotic pressure?

- (a) 1 molar solution of urea
(b) 1 molar solution of glucose
(c) 1 molar solution of sodium chloride
(d) 1 molar solution of magnesium chloride

19. The osmotic pressure of dilute solution is given below by relationship:

- (a) $\pi = MRT / C$
(b) $\pi = RCT / M$
(c) $\pi = MR / TC$
(d) $\pi = RC / TM$

20. A solution of contains 2 moles of sucrose in 6 moles of water. What is the mole fraction of sucrose?

- (a) 0.25 (b) 0.75
(c) 0.5 (d) 3.0

21. A solution has three components A, B and C, the mole fraction of A and C are 0.15, 0.45 respectively the mole fraction of component B:

- (a) 0.25 (b) 0.005
(c) 0.40 (d) 0.60

22. The stability of colloidal system depends on:

- (a) Charge on the particle

- (b) Salvation
(c) Brownian motion
(d) All of the above

ETEA 2017

23. Select an incorrect statement about collides:

- (a) Colloidal particles carry charges
(b) Addition of electrolytes coagulates the solution
(c) Every substance can be made to behave like lyophobic collides
(d) Every solid substance can be brought to colloidal state

24. 10.0dm³ gas cylinder containing mixture of various gases 50cm³ of nitrogen gas is in the mixture what is the concentration of N₂ gas in part per billion [ppb]?

- (a) $\frac{50}{1000} \times 10^9$
(b) $\frac{50}{10000} \times 10^9$
(c) $\frac{50}{100000} \times 10^6$
(d) $\frac{50}{1000} \times 10^6$

25. Colloidal particles can be separated by using:

- (a) Ordinary filter paper
(b) Coarse filter paper
(c) Fine filter paper
(d) Extremely fine filter paper

26. Solubility of non-polar solute in non-polar solvent is because of:

- (a) Their same molecular sizes
(b) Large difference in molecu-

lar sizes of solute and solvent.

(c) Weak Vander Waal's forces of solvent and solute particles.

(d) Both (a) & (c)

27. Select completely immiscible pair of liquids:

(a) Phenol-water system

(b) Trimethylamine and water system

(c) Carbon disulphide and water system

(d) Ethanol and water system

28. How many grams of $(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$ be dissolved in 500cm^3 of distilled water to get 0.1M solution? [Molecular mass of Mohr's salt is 392]

(a) 39.2g (b) 3.92g

(c) 19.6g (d) 1.96g

29. 50.0cm^3 of a KOH solution is titrated to the phenolphthalein end point with 7.50cm^3 of 1.0M HCl . The concentration of KOH :

(a) 7.5M (b) 0.75M

(c) 0.15M (d) 1.5M

30. Molality of 10% w/w NaOH solution is:

(a) 1.5m (b) 2.0m

(c) 2.5m (d) 3.5m

31. If the force of attraction exists between the particles of dispersed phase and dispersion medium terms the sol is called:

(a) Lyophilic (b) Lyophobic

(c) Hydrophilic (d) Hydrophobic

ETEA 2018

32. The molality of 2.0g of NaOH [$M\cdot\text{wt} = 40\text{g/mol}$] in 250g of dis-

tilled water a 4°C will be exactly equal to:

(a) 0.20m (b) 0.25

(c) 1.20 (d) 0.5

33. The elevation in boiling point ΔT_b is equal to ebullioscopy constant K_b when the molarity $[M]$ of solution is:

(a) 0.1m (b) 1.0m

(c) 10.0m

(d) Statement is wrong

34. The mass of NaOH needed to prepare 0.2 molal solution in 500g pure water at 4°C is:

(a) 0.4g (b) 4.0g

(c) 1.5g (d) 1.0g

35. A student dissolved 50.5g KNO_3 [$\text{KNO}_3 = 101.0\text{g/mol}$] in 1000g distilled water and allowed to boil. The solution started boiling:

(a) 100.52°C (b) 100°C

(c) 101.04°C

(d) KNO_3 insoluble in water

36. During the formation of aqueous solution of any electrolyte:

(a) Heat is evolved

(b) Heat is absorbed

(c) Heat may evolved or absorbed

(d) Electrolyte do not dissolve in water

37. Addition of soluble impurities into a liquid and solid respectively causes:

(a) Increase in boiling point of liquid and decrease in melting point of solid

(b) Increase in both boiling and melting points

(c) Decrease in boiling point of liquid and increase in melting point of solid

(d) Decrease in both boiling and melting points

ETEA 2019

38. Which one of the following concentration units is temperature dependent?

- (a) Molality
- (b) Mole fraction
- (c) Molarity
- (d) Both (a) & (c)

39. Phase and dispersion medium for soap lather is respectively:

- (a) Gas and solid
- (b) Gas and liquid
- (c) Liquid and liquid
- (d) Solid and liquid

40. Which one is not corrects for the stability of colloidal solution?

- (a) Greater charge density on colloid
- (b) Less solvation energy
- (c) More Brownian motion
- (d) None of the above

41. Which of the following pair is an example of completely immiscible liquid?

- (a) Alcohol and water
- (b) Alcohol and ether
- (c) Water and ether
- (d) Carbon disulphide and water

ANSWER KEY

1.d	2.a	3.d	4.a	5.c	6.b
7.b	8.b	9.c	10.d	11.d	12.d
13.d	14.b	15.c	16.b	17.a	18.d
19.b	20.a	21.c	22.d	23.c	24.b
25.d	26.c	27.c	28.c	29.c	30.c
31.a	32.a	33.d	34.d	35.a	36.c
37.c	38.c	39.b	40.b	41.d	



CHAPTER # 11

ETEA 2005

1. The study of heat changes accompanying chemical reaction is known as:

- (a) Thermo-chemistry
- (b) Thermodynamics
- (c) Electro chemistry
- (d) Chemical kinetics

2. Which of the following ions has largest heat of hydration?

- (a) Ba^{+2}
- (b) K^{+1}
- (c) Li^{+1}
- (d) Be^{+2}

3. The net heat change in a chemical reaction is same whether it takes place in one step or several steps.

This law is known as:

- (a) First law of thermodynamic
- (b) Henner's law
- (c) Hess's law
- (d) Joule's law

ETEA 2007

4. Which of the following ions has largest heat of hydration?

- (a) Ba^{+2}
- (b) K^{+1}
- (c) Li^{+2}
- (d) Be^{+2}

ETEA 2008

5. The change of enthalpy is a measure of the reaction at:

- (a) Constant volume
- (b) Constant volume & pressure
- (c) Variable pressure
- (d) Constant pressure

ETEA 2010

6. Ca^{++} ions are more hydrate than

Na⁺ ions because there are:

- (a) Larger in size
- (b) Smaller in size
- (c) Divalent positively charged
- (d) Small and divalent positively

7. A chemical system is sealed in a strong rigid container at room temperature and then heated vigorously change in work done during process is:

- (a) Positive
- (b) Negative
- (c) Zero
- (d) Constant

ETEA 2011

8. Hydration energy is the heat evolved or absorbed when:

- (a) One of mole of gaseous ions is dissolved in one mole of water.
- (b) One mole of ions in solid state is dissolved in one mole of water.
- (c) One mole of gaseous ions is dissolved in water to give infinity dilute solution.
- (d) One mole of ions in solid state is dissolved to form concentrated solution.

ETEA 2012

9. Which one is spontaneous chemical reaction?

- (a) $Zn + Cu^{2+} \rightarrow Zn^{2+} + Cu$
- (b) $Zn^{2+} + Cu \rightarrow Cu^{2+} + Zn$
- (c) $2Fe(OH)_3 \rightarrow 2Fe + 3/2 O_2 + 3H_2O$
- (d) $2NaCl \rightarrow 2Na + Cl_2$

10. The enthalpy of the elements at 1atm pressure and 298K is arbitrary given the value of:

- (a) 0.1
- (b) 1.0
- (c) 29.8
- (d) Zero

11. The standard molar enthalpy of formation is denoted by:

- (a) ΔH
- (b) ΔH°
- (c) ΔH_{273}°
- (d) ΔH_{298}°

12. Select the correct statement about lattice energy:

- (a) The energy absorbed when 1 mole of ionic crystal lattice is formed from its constituent ions in the gaseous state.
- (b) The energy liberated when 1 mole of an ionic crystal lattice is formed from its constituent ions in the gaseous state.
- (c) The energy liberated when 1 mole of an ionic crystal lattice is splitted into its constituent ions in the gaseous state.
- (d) None of the above

13. Choose the correct statement about born Haber cycle.

- (a) Born Haber cycle is a process for applying Hess's law to the standard enthalpy changes in the formation of covalent compounds.
- (b) Born Haber cycle is a process for applying Hess's law to the standard enthalpy changes in the formation of ionic compound.
- (c) Born Haber cycle is a process for applying Hess's law to the standard enthalpy changes in the for-

mation of ionic and covalent compounds.

(d) None

ETEA 2013

14. Which one of the following is not a state function?

- (a) Enthalpy (b) Free energy
(c) Work (d) Energy

15. The first law of thermodynamics has a statement which implies that:

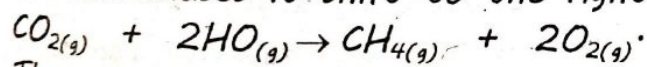
- (a) No heat enters or leaves the system
(b) The temperature remains constant
(c) All work is mechanical
(d) Energy is conserved.

16. The change in enthalpy at constant pressure ΔH is equal:

- (a) $\Delta H = q + P\Delta V$
(b) $\Delta H = q_p = \Delta E - P\Delta V$
(c) $\Delta H = \Delta E + P\Delta V$
(d) $\Delta H = q - P\Delta V$

ETEA 2014

17. Providing heat for the following reaction causes it shift to the right



The reaction can therefore be described as:

- (a) Spontaneous
(b) Adiabatic
(c) Endothermic
(d) Exothermic

18. Which one is not used in calculating the lattice energy of crystalline solids?

- (a) Haber process
(b) Born Haber cycle
(c) Hess's law
(d) Enthalpy changes

ETEA 2015

19. First law of thermodynamics is expressed as:

- (a) $q = \Delta E + W$
(b) $\Delta E = q - W$
(c) $q = \Delta E - P\Delta V$
(d) All

20. Which of the following is not a state?

- (a) Work
(b) Internal energy
(c) Entropy
(d) Pressure

ETEA 2016

21. For which of the following standard heat of formation is not zero?

- (a) $\text{Cl}_{2(g)}$ (b) $\text{Na}_{(s)}$
(c) $\text{Br}_{2(g)}$ (d) $\text{Hg}_{(l)}$

22. Students were decomposing CaCO_3 placed in a China dish by heating using burner in the laboratory. The "system" in this experiment is:

- (a) China dish (b) Burner
(c) Laboratory (d) CaCO_3

ETEA 2018

23. Neutralization is always an exothermic phenomenon which neutralization reaction below evolves more heat:

- (a) $\text{NaOH}_{(aq)} + \text{HClO}_{4(aq)}$
(b) $\text{KOH}_{(aq)} + \text{HNO}_{3(aq)}$
(c) $\text{NaOH}_{(aq)} + \text{H}_2\text{SO}_{4(aq)}$
(d) All evolve same heat

24. The first law of thermodynamic is a statement which implies that:

- (a) No heat enters or leaves the system
(b) The temperature remains constant

CHAPTER # 12

ETEA 2007

- (c) All work is mechanical
 (d) Energy is conserved
25. "The energy change in a closed cycle from initial to final state is zero" this statement is obeyed by:
- (a) Born Haber cycle
 (b) Law of conservation of energy
 (c) First law of thermodynamics
 (d) All of the above
26. The amount of heat required to raise the temperature to raise the temperature of 10 moles of water from 70K to 80K (molar heat capacity of water is 75.24J) is:
- (a) 0.7529J (b) 7524J
 (c) 95.24J (d) 752.4J

ETEA 2019

27. Which one of the following is not a state function?
- (a) Work (b) Enthalpy
 (c) Internal energy
 (d) Pressure
28. Which one is not endothermic process?
- (a) Atomization of I_2
 (b) Electrolysis of water
 (c) Condensation of vapours
 (d) Both (a) & (c)

ANSWER KEY

1.a	2.d	3.c	4.d	5.d	6.d
7.c	8.c	9.a	10.d	11.d	12.b
13.b	14.c	15.d	16.c	17.c	18.a
19.d	20.a	21.c	22.d	23.d	24.d
25.d	26.b	27.a	28.c		



1. The emf of a galvanic cell can be calculated from:

- (a) The size of the electrode
 (b) The pH of the solution
 (c) The amount of metal in the anode
 (d) The E° values of the half cell

2. The oxidation number of Cl in $Ca(ClO_3)_2$

- (a) -2 (b) +3
 (c) +5 (d) -6

ETEA 2008

3. Which of the following cannot be displaced from their salt solution by copper?

- (a) Ag (b) Au
 (c) Pt (d) Zn

4. Lithium is generally used as an electrode in high energy density batteries, because:

- (a) It is the lightest metal
 (b) It has high negative reduction potential
 (c) It is quite reactive
 (d) It does not corrode easily

ETEA 2009

5. The stronger the reduction potential the more difficult it is to:

- (a) Oxidize the compound
 (b) Reduce the compound
 (c) Electrolyze the compound
 (d) None of the above

6. Which statement is correct?

- (a) Standard hydrogen electrode [SHE] always acts as anode
- (b) "SHE" may act as cathode or anode depending upon the reduction of the counterpart.
- (c) "SHE" always acts as cathode in voltaic cells.
- (d) None of the above

ETEA 2010

7. If we pass current through the sucrose solution the galvanometer will not show any deflection because sucrose molecules:

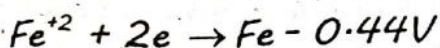
- (a) Move towards cathodes
- (b) Move towards anode
- (c) React with water
- (d) Remain neutral

8. Which of the following is not considered to be an oxidizing agent?

- (a) MnO_2
- (b) Cl_2
- (c) $NaOH$
- (d) Na_2O_2

ETEA 2011

9. What will happen if a block of copper metal is dropped into a beaker containing a solution of 1M $FeSO_4$?



- (a) The copper will dissolve with no other.
- (b) The copper will dissolve and Fe will be precipitated out.
- (c) The copper will dissolve with the evolution of H_2 gas.
- (d) No reaction will occur

ETEA 2012

10. The best known and the most highly developed fuel cell is the hydrogen/oxygen fuel cell. This is known as:

- (a) Proton exchange membrane cell
- (b) Bacon cell
- (c) Regenerative cell
- (d) None of the above

11. Select the strongest reducing agent.

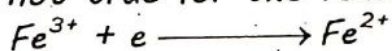
- (a) Cl^{-1}
- (b) Ne
- (c) Na^{+}
- (d) Ca^{+2}

ETEA 2013

12. What will happen if a block of a copper is dropped into a beaker containing a solution of 1.0M of $ZnSO_4$?

- (a) The copper will dissolve with no other change.
- (b) The copper will dissolve zinc metal will be deposited
- (c) The copper will dissolve with the evolution of $H_{2(g)}$
- (d) No reaction will occur

13. Which statement given below is not true for the reaction:

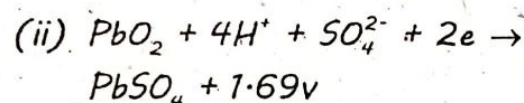
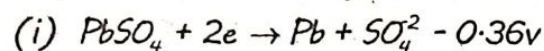


- (a) Fe^{3+} is being reduced
- (b) The oxidation state of Fe has changed.
- (c) Fe^{3+} could be referred to as a reducing agent in this reaction.
- (d) Both Fe^{3+} and Fe^{2+} are called cations.

14. Considering the standard reducing chart, the strong reducing agent

value is:

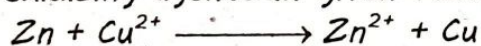
- (a) Small negative values
 - (b) Large negative values
 - (c) Small positive values
 - (d) Large positive values
15. The two half-cell reactions are involved in the discharge of a lead storage battery. The potential a single cell lead storage is:



- (a) 1.33V
 - (b) 4.10V
 - (c) 2.66V
 - (d) 2.06V
16. Which statement is correct while recharging the automobile battery?

- (a) Pb is converted to PbO_2
- (b) PbSO_4 is converted to Pb
- (c) Pb is converted to PbSO_4
- (d) None of the above

17. Which of the following is the oxidizing agents in given reaction?



- (a) Cu^{+2}
- (b) Zn
- (c) Zn^{2+}
- (d) Cu

18. Select the strongest reducing agent:

- (a) Ar
- (b) K^+
- (c) Cl^-
- (d) Ca^{+2}

19. If salt bridge is not employed between two half cells in the galvanic cell, then the effect on the voltage would be:

- (a) Decrease rapidly
- (b) Decrease slowly
- (c) Drops to zero
- (d) Increase slowly

ETEA 2015

20. The oxidation state of carbon in Na_2C_2 is:

- (a) +4
- (b) +2
- (c) -1
- (d) -4

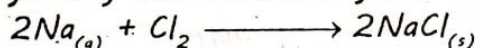
21. The cathode in lead storage battery is made of:

- (a) Lead
- (b) Lead oxide
- (c) Lead hydroxide
- (d) None

22. What is the oxidation state of copper in Cs_2CuF_6 ?

- (a) +1
- (b) +2
- (c) +3
- (d) +4

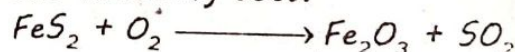
23. Choose the true statement regarding the reaction given below:



- (a) Chlorine is oxidized and sodium is reduced.
- (b) Chlorine acts as oxidizing agent and sodium acts as reducing agent.
- (c) Chlorine acts as reducing agent and sodium acts as oxidizing agent.
- (d) Both chlorine and sodium acts as an oxidizing agent.

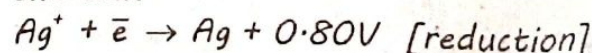
ETEA 2016

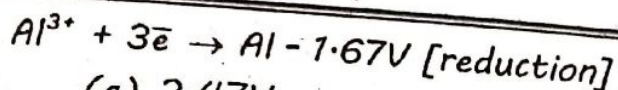
24. Balance the given equation by using the suitable coefficients from the following sets:



- (a) 4:11:2:8
- (b) 1:10:2:8
- (c) 6:5:3:7
- (d) 2:11:4:8

25. A cell is constructed of the following two half cells. What is E° of the cell?





- (a) 2.47V (b) 0.087V
(c) -0.87V (d) 5.81

26. In which of the following reaction hydrogen acts as oxidizing agent?

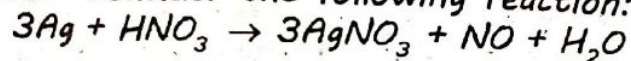
- (a) $\text{H}_2 + \text{Cl}_2 \longrightarrow 2\text{HCl}$
(b) $\text{C}_2\text{H}_4 + \text{H}_2 \longrightarrow \text{C}_2\text{H}_6$
(c) $2\text{Na} + \text{H}_2 \longrightarrow 2\text{NaH}$
(d) $\text{N}_2 + 3\text{H}_2 \longrightarrow 2\text{NH}_3$

27. Which is strong electrolyte?

- (a) $\text{Ca}(\text{OH})_2$ (b) SiCl_4
(c) KCl (d) SrCl_2

ETEA 2017

28. Consider the following reaction:



Select the true statement:

- (a) Silver is reduced
(b) NO_3^- is oxidized to NO
(c) Silver gains electrons
(d) Nitrogen accepts electron

29. Choose the incorrect statement about corrosion.

- (a) Corrosion cannot be eliminated completely.
(b) Employing modern techniques corrosion can be completely eliminates.
(c) Corrosion process can be slowed down by certain methods.
(d) The presence of acidic oxide in the environment can accelerate the process of corrosion.

30. Choose the wrong statement:

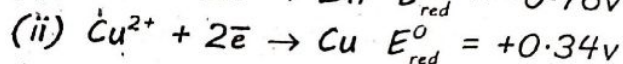
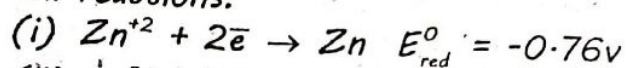
- (a) Operating life for fuel cell is unlimited.
(b) Electrode in fuel cell may be porous solid and may contain catalyst

- (c) The fuel in fuel cell can be gas, liquid, solid or solution
(d) In fuel cell the cell products cannot be regenerated

31. Food article spoiling involves oxidation reduction processes; to prevent this reaction we usually add preservative which act as:

- (a) An oxidizing agent
(b) A reducing agent
(c) An acid
(d) A base

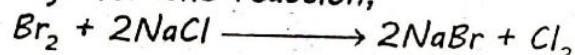
32. Calculate E° cell from the half cell reactions:



- (a) 1.70V (b) 1.20V
(c) 1.0V (d) 1.40V

ETEA 2018

33. Students calculated the cell voltage for the reaction,

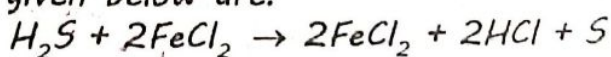


Through the formula $E^\circ_{\text{cell}} = E^\circ_{\text{red}} + E^\circ_{\text{oxd}}$

The answer was negative, it means that:

- (a) The reaction is non - spontaneous and feasible
(b) The reaction is non - spontaneous and not feasible
(c) The reaction is spontaneous and feasible
(d) The reaction is spontaneous and not feasible

34. The oxidizing and reducing agents respectively in the reaction given below are:



- (a) S^{2-} , Fe^{3+} (b) Fe^{2+} , S^{2-}
(c) Fe^{3+} , S^{2-} (d) S^{2-} , Cl^-

35. The oxidation number of carbon

in $Mg(HCO_3)_2$ is:

- (a) +4 (b) -4
(c) -2 (d) Zero

36. The reducing agent in the reaction given is: $KMnO_4 + KI + H_2SO_4 \rightarrow MnSO_4 + K_2SO_4 + I_2 + H_2O$

- (a) $KMnO_4$ (b) KI
(c) H_2SO_4
(d) KI and H_2SO_4 both

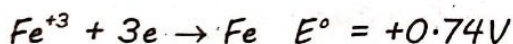
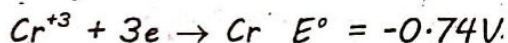
37. The aqueous solution of which of the following electrolyte will conductor electric current to large extent:

- (a) $Mg(OH)_2$ (b) H_2CO_3
(c) NH_4Cl (d) NH_4OH

38. Chrome plating is related to:

- (a) Daniel cell (b) Voltaic cell
(c) Electrolytic cell
(d) Fuel cell

39. The standard reduction potential for the two half-cell reactions are give:



- (a) Cr oxidizes & acts as anode
(b) Fe reduces & acts as anode
(c) Cr reduces & acts as anode
(d) Fe oxidizes & acts as anode

ETEA 2019

40. The oxidation state of nitrogen in NH_4NO_3 are:

- (a) -3 and +5 (b) +5 and +3
(c) -3 and -3 (d) Zero

41. During the discharge of lead storage battery:

- (a) Pb is dissolved at the cathode
(b) Pb is desposited at the cathode
(c) $PbSO_4$ is formed both at

anode and cathode

- (d) Concentration of H_2SO_4 increase

42. When zinc electrode is coupled with copper in a galvanic cell.

- (a) Reduction takes place at zinc electrode
(b) Oxidation takes place at copper electrode
(c) Reduction takes place at copper electrode
(d) Both (a) & (b)

43. Zinc and copper electrodes are connected for galvanic cell and salt bridge is also immersed in both the half-cell, the salt bridge will give cation to:

- (a) Copper half-cell
(b) Zinc half-cell
(c) Both (a) & (b)
(d) None of the above

ANSWER KEY

1.d	2.c	3.d	4.b	5.a	6.b
7.d	8.c	9.d	10.b	11.a	12.d
13.c	14.b	15.d	16.b	17.a	18.c
19.c	20.c	21.b	22.d	23.b	24.a
25.a	26.c	27.c	28.d	29.b	30.d
31.b	32.a	33.b	34.c	35.a	36.a
37.c	38.c	39.a	40.a	41.c	42.c
43.a					



Composed by

JG: 0318 922 20 98

CHAPTER # 4**ETEA 2005**

1. A mixture of 50g H_2 and 50g He has a total pressure of 1.5 atm. What is the partial pressure of H_2 ?

- (a) 1.0atm (b) 2.0atm
(c) 1.5atm (d) 3.0atm

2. Rate of diffusion of NH_3 is 1.6 times faster than CO_2 . The correct form of the rate law equation for this statement will be.

- (a) $r_{NH_3}/r_{CO_2}=1/1.6$
(b) $r_{NH_3}/r_{CO_2}=1.6/1$
(c) $r_{CO_2}/r_{NH_3}=1/1.6$
(d) None of these

3. Which gas deviates most from ideal behavior at room temperature and pressure?

- (a) Hydrogen
(b) Nitrogen
(c) Methane
(d) Sulphurdioxide

ETEA 2006

4. Consider an equation:



The partial pressure (in atm) of N_2 under normal atmospheric pressure is.

- (a) 0.05 (b) 0.25
(c) 0.35 (d) 0.45

ETEA 2007

5. In a closed room of 100^3 , a perfume bottle is opened up. The room develops smell. This is due to which property of gases?

- (a) Diffusion
(b) Viscosity
(c) Density
(d) None of these

6. A bottle of dry NH_3 and a bottle of dry HCl connected through long tube are opened simultaneously at both ends. The white NH_4Cl ring formed will be.

- (a) At the center of tube
(b) Near the NH_3 bottle
(c) Near the HCl bottle
(d) Throughout the length of the tube

7. If a single balloon is filled with equal volumes of hydrogen, helium, nitrogen, and neon, which gas will be depleted first?

- (a) Helium
(b) Hydrogen
(c) Nitrogen
(d) Neon

ETEA 2008

8. $4.0dm^3$ of O_2 at a pressure 800atm and $1.0dm^3$ of N_2 at a pressure of 100 atm are into a $2.0dm^3$ vessel. The total pressure in the vessel is.

- (a) 800atom (b) 600atom
(c) 900atom (d) 200atom

9. The ideal gas equation is $PV=nRT$ the symbol n is SI unit represent.

- (a) The number of molecules in the gas
(b) Hydrogen
(c) Nitrogen
(d) Neon

ETEA 2009

10. Real gases deviate more from ideal behavior at:

- (a) At high temperature only
- (b) High pressure only
- (c) High pressure and low temperature
- (d) Low pressure and high temperature

ETEA 2010

11. At constant temperature if the pressure of the gas is doubled its volume becomes:

- (a) One half
- (b) Double
- (c) Four times
- (d) Remains the same

12. Which scientist made the following proposal: equal volume of gases under the same condition of temperature and pressure contains the same number of particles?

- (a) Gay-Lussac
- (b) Curie
- (c) Dalton
- (d) None

ETEA 2011

13. Which one of the following closely resembles an ideal gas?

- (a) Xe
- (b) H₂
- (c) CO₂
- (d) He

14. At constant temperature, if the volume of the given mass of a gas is doubled, then the density of the gas becomes:

- (a) Double
- (b) One half
- (c) One quarter
- (d) Four times

ETEA 2012

15. Why does an ideal gas exert pressure on its container?

- (a) The molecules of the gas collide continually with each other
- (b) The molecules of the gas collide in elastically with the walls of the container
- (c) The molecules of the gas collide continually with the walls of the container
- (d) The weight of the molecules exerts a force on the walls of the container

ETEA 2013

16. Which thermodynamic temperature is equivalent to 501.85°C?

- (a) 775.00k
- (b) 774.85k
- (c) 228.85k
- (d) 228.70k

17. 40.0 dm³ of an ideal gas at 25°C and 750 mmHg is expanded to 50.0 dm³. The pressure of the gas changed to 765 mmHg. What is the temperature of the gas?

- (a) $\frac{(2912)(750)(50)}{(40)(765)}$
- (b) $\frac{(298)(765)(50)}{(40)(750)}$
- (c) $\frac{(2912)(765)(50)}{(750)(40)}$
- (d) $\frac{(750)(40)}{(298)(765)(50)}$

18. The internal energy of fixed masses of an ideal gas depends on:

- (a) Pressure, but not volume or temperature