

FOCUS

ACCORDING TO SINGLE
NATIONAL CURRICULUM
2022

MIDDLE

STUDENT RESOURCE BOOK

7

**COMPLETE
GUIDE**

**General
Science**



FOCUS PUBLICATIONS

www.newclassicpublishers.com
E-mail: classicnsr@gmail.com
0321-9596220

Download PDF MCQs, Books and Notes for any
subject from the Largest website for free
awazeinqilab.com آواز انقلاب ڈاٹ کام



and also Available in Play Store



Primary (5th) Level

Middle (8th) Level

Matric (10th) Level

F. Sc (12th) Level

BS (16th) Level

Urdu Grammar

Curriculum (Govt Books)

Past Papers

English Grammar

Readymade CV

NTS, FTS, CSS, PMS,
ETEA, KPPSC, PPSC,
SPSC, AJKPSC, BPSC,
KPTA ETC

Subject کے Notes اور MCQS فری
ڈاؤن لوڈ کریں۔ نیز CV کے MS word تیار

Templates ڈاؤن لوڈ کر کے اپنے حساب



سے Modify کریں۔

awazeinqilab.com

Available Subjects

- Agriculture
- Computer Science
- Economics
- English
- Biology
- Chemistry
- Geology
- Management Sciences
- Microbiology
- PCRS/ Pak Study
- Pharmacy
- Sociology
- Zoology
- Chemistry
- Statistics
- Physics
- Mathematics
- Law
- Environmental Sciences
- Botany
- Biotechnology
- Library & Information Sciences
- Journalism & Mass Communication
- Political Science
- Geography
- General Science
- Education
- Tourism & Hotel Management
- Urdu
- Pashto
- Islamic & Arabic Studies
- Electrical Engineering
- Civil Engineering
- Mechanical Engineering
- Chemical Engineering
- Software Engineering
- Election Officer
- General Knowledge
- Pedagogy
- Current Affairs
- Medical Subjects
- Judiciary & Law
- other



Follow me on Face book

ABDULLAH INQLABI



WhatsApp : 03025247378

GENERAL SCIENCE 7

CONTENTS

Unit No	Particulars	Page No
1	Plant Systems	249
2	Human Respiratory and Circulatory System	252
3	Immunity and diseases	256
4	Physical and chemical changes	259
5	Structure of an Atom	262
6	Chemical bond	264
7	Solution	267
8	Force and motion	270
9	Waves and energy	274
10	Heat and Temperature	279
11	Technology in Everyday life	282
12	Earth and Space	284 - 286

UNIT 1

PLANT SYSTEMS

A. MCQs (Choose the correct options)

- The root system which can get water from deep underground sources is.
 - Fibrous roots ✓
 - Tap root
 - Storage Roots
 - Root nodules
- Which of the following is not an organ of plant?
 - Epidermis ✓
 - Root
 - Stem
 - Leaf
- Vascular bundles are present in every part of the plant. They are made up of:
 - Xylem only
 - Phloem only
 - Xylem and Phloem ✓
 - Xylem, phloem and root hair cells.
- Amna liked to grow plants on her terrace. The plants were getting light and water everyday but they were not growing properly. What suggestion can you give her to improve plant growth?
 - Add sugar to plant pots
 - Give water once a week
 - Add compost fertilizer to plant pots
 - Shift them indoors. ✓
- If water available to plant becomes less. Then stomata are closed at day time. This protects plants from:
 - Photosynthesis
 - Respiration
 - Wilting ✓
 - Transport of water
- The protective layer around plant part is.
 - Epidermis ✓
 - Cortex
 - Mesophyll
 - Vascular bundle
- If the concentration of carbon dioxide increases in the air during daytime the process of.
 - Photosynthesis will decrease
 - Respiration will decrease
 - Photosynthesis will increase ✓
 - Respiration will increase.
- Plants perform respiration all the time. The purpose of respiration in plant is to
 - prepare food
 - Release energy
 - Absorb energy ✓
 - Maintain health growth
- If you stay under trees at night, you feel dizziness due to.
 - High level of oxygen and low level of carbon dioxide.
 - Low level of oxygen and high level of carbon dioxide ✓

- Poisonous gases released by trees
- Ghost living trees

10. Which of the following is the correct word equation for respiration?

- Carbon Dioxide + water → Glucose + oxygen
- Carbon Dioxide + Water + sunlight → Glucose + oxygen
- Glucose + oxygen → Carbon dioxide + water
- Glucose + oxygen → Carbon dioxide + water + Energy ✓

B. True and false (Correct the statement if it is false)

- Exchange of gases in plants takes place through tiny holes called stomata located on the margins of leaves.

False:

Exchange of gases in plants take place through tiny holes called stomata located on lower surface of leaves.

- The rate of photosynthesis is slow in variegated leaves because there is maximum amount of chlorophyll in them.

False:

The rate of photosynthesis is slow in variegated leaves because there is minimum amount of chlorophyll in them.

- Respiration only takes place in animal cells because they need energy.

False:

Respiration takes place in all living organism because they need energy.

- The Job of the root hairs to protect the roots from damage.

False:

The job of the root hairs is absorption of water.

- Xylem is dead tissue while phloem is living tissue.

True:

C. Short Questions

Q1. What are the three functions of roots?

Ans. The three functions of roots are given below.

- Roots absorb water and nutrients from the soil.
- Root help in storing food and nutrients to the plants.
- Roots fix the plant to the soil.
- Root provides mechanical support to aerial part of the plant.

Q2. How stomata help in the process of photosynthesis?

Focus Student Resource Book

(250)

Ans. When the air temperature rises the stomata opens the pores to let carbon-dioxide in after entering through the pores the plant starts preparing food through photosynthesis

Q3. Why respiration takes place in plants?

Ans. Plants also need energy. The plants get energy through the process of respiration in which glucose food breaks down in the presence of Oxygen to form carbon-dioxide and water with the release of energy. This energy is used by the plants of carrying out its various life processes.

Q4. How is photosynthesis important for:**a. Plant**

Photosynthesis is important for plants because plants trap photo (light) energy of sun and converts it into chemical energy that is glucose and Oxygen.

Carbon dioxide + Water $\xrightarrow[\text{Chlorophyll}]{\text{Sunlight}}$ Glucose + Oxygen

By this process plant makes their own and some oxygen produced is used for respiration.

b. Humans and other animals

By the help of photosynthesis, plants traps solar energy for human beings and other animals and also provide Oxygen for them and absorb their released energy.

c. Atmosphere

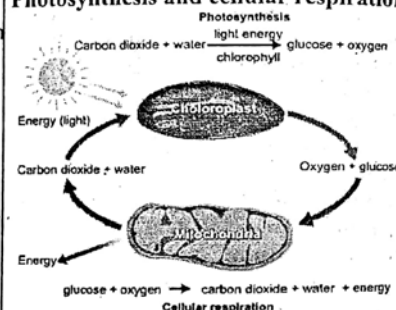
Carbon-dioxide utilized and Oxygen products during photosynthesis, so Carbon and Oxygen of atmosphere are dependent on plants (photosynthesis).

D. Long Questions**1. Compare the properties of Xylem and Phloem**

Xylem	Phloem
Xylem carries water from roots to leaves	Phloem carries food from leaves to growing parts and storage organs.
Xylem made up of dead cells	Phloem made up of living cells
Cell walls in xylem is thick	Cell wall in phloem is thin.
Xylem is found in centre of the vascular bundle.	Phloem is found outside the vascular bundles

2. Photosynthesis and respiration are two different processes. Differentiate between them.

	Respiration	Photosynthesis
Occurs in	All living things	Only green parts of plants
When it occurs	All the time	Only in day light
Organelle involved	Mitochondria	Chloroplast
Reactants	Glucose and oxygen	Carbon dioxide and water
Products	Carbon dioxide and water	Glucose and oxygen
Energy link	Energy is released	Energy is absorbed

E. Structured Questions**1. The Following diagram shows the two processes taking place in the plant cell i.e. Photosynthesis and cellular respiration.****a. Which process takes place only in green parts of the plant?**

Photosynthesis

b. Which process takes place in all living cells at all time?

Respiration

c. Which process only takes place during day time?

Photosynthesis

d. Which process can help to balance carbon dioxide level in the air?

Photosynthesis

e. Which structure acts as a solar panel?

Chloroplast

2. The table shows the transpiration of a plant in different conditions?

Conditions	Transpiration rate (mm)
Darkness	1
Bright light	17
Still air	9
Moving air	21

General Science -7

Focus Student Resource Book

(251)

Dry air	11
Moist air	5
Warm air	16
Cold air	6
Dry soil	2
Moist soil	18

a. Which condition causes the fastest rate of transpiration?

Ans. Moving air cause the fastest rate of transpiration.

b. What sort of condition can increase the rate of transpiration?

Ans. The conditions that can increase the rate of transpiration are;

- Moist soil
- Bright light
- Dry light
- Moving air

c. What sort of conditions can decrease the rate of transpiration?

Ans. The conditions that decrease the rate of transpiration are;

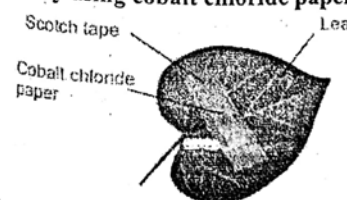
- Cold air
- Moist air
- Still air
- Darkness

d. How does transpiration in the water cycle?

Ans. Water from the leaves transfer the air through transpiration, then in atmosphere it precipitates down in the form of rain. This rain water absorbed by the soil again gets absorbed by plants. This process starts again. This is called water cycle.

Activity 1.1**Transpiration from leaves**

To demonstrate the transpiration from leaves by using cobalt chloride paper.

**Material required**

- Cobalt chloride paper
- Plant in bright light
- A pair of scissors
- Scotch tape (broad)

General Science -7

Procedure

1. Attach a small piece of dry cobalt chloride paper on the upper surface of an intact leaf using scotch tape.

2. Do the same on the lower surface of that leaf.

3. Cobalt chloride paper should be completely covered with scotch tape.

4. After a short while observe the colour of the papers.

a. Why does the cobalt chloride paper attached with leaves changes colour?

Ans. The colour of the cobalt paper changes from blue to pink due to moisture released from transpiration

b. Which piece of cobalt chloride paper changes its colour first?

Ans. Paper attached to lower side will change colour first because number of stomata's are large on lower side.

c. Why is scotch tape used in this experiment instead of office pins?

Ans. Pins can damage leaf xylem and scotch tap avoids water vapours to escape.

Activity 1.2**Minerals and plant growth**

- Material
- Two litre soda bottles
- Wick (strip of fabric)
- Growing media (sand, soil with compost)
- Small plants of same size
- Scissors

Procedure

• Remove cap of bottle. Cut upper half of bottle and invert it on the bottom part of bottle.

• Make a hole in cap and stuff wick through it.

• Put the cap and hang the wick in bottom part of bottle.

• Fill growing media in upper part of the bottle.

• Fill one bottle with sand and other bottle with soil containing compost. Plant small plants of same size in bottles. Pour some water in bottom part. Make sure that wick becomes completely wet. Leave the set up near light for two weeks

Focus Student Resource Book

(252)

General Science -7

a. Predict what will happen?

Ans. Plant grow in soil compost will grow faster because it absorbs water as compared to plant which will grow in sand, because it doesn't absorb water and it drains out.

b. Which plant will show better growth?

Ans. Plant grow in soil with composite will show better growth.

Observe after two weeks

c. Are both plants equal in size?

Ans. No, both plants aren't equal in size.

d. Is the number of leaves same in both plants?

Ans. No, the numbers of leaves aren't same in both plants.

e. Is the colour of leaves same in both plants?

Ans. No, the colours of leaves aren't same both plants because plants with sand have leaves wilted.

f. Which plant is showing better growth?

Ans. Plant grown in soil with compost shows better growth.

g. What can be the reason of this difference?

Ans. Plant grow in soil with compost shown better growth because it fulfil necessary conditions like soil, water and nutrients.

Additional questions

Q1. How many types of roots?

Ans. There are two main types of roots.

1. Tap Roots
2. Fibrous roots

Q2. Define Aerial roots?

Ans. Aerial Roots are roots that grow on the parts of a plant above the ground.

Q3. How many types of stem?

Ans. Two main types of stem are.

1. Herbaceous stem
2. Wood stem

Q4. What are the factor affecting the transpiration?

Ans. The light intensity, temperature, humidity wind and water supply will all affect the transpiration rate.

Q5. Define transpiration?

Ans. Transpiration is the movement of materials from one place to another.

UNIT 2 HUMAN RESPIRATORY AND CIRCULATORY SYSTEM

A. MCQs (Choose the correct option)

1. A team of climbers was climbing a high mountain. When they reached near top they felt difficulty in breathing because at high altitude there is.

- a. More oxygen
- b. Less oxygen✓
- c. More carbon dioxide
- d. Low temperature

2. The exchange of substances between blood and body cells take place at the:

- a. Capillaries✓
- b. Veins
- c. Arteries
- d. Heart

3. A person affected with anaemia looks pale and feels tired. All his body cells are getting

- a. less food
- b. Less oxygen✓
- c. Less water
- d. Less carbon dioxide

4. The exchange of gasses between blood and air takes place at:

- a. Trachea
- b. Bronchi
- c. Bronchioles
- d. Alveoli✓

5. Cellular respiration always requires.

- a. Glucose and oxygen✓
- b. Glucose
- c. Glucose, oxygen and carbon dioxide
- d. Alcohol, lactic acid and carbon dioxide

6. Valves are flaps that keep blood flowing in one direction. Valves are found in:

- a. Artery and vein
- b. Artery, vein and capillary
- c. vein and heart✓
- d. Artery, vein capillary and heart

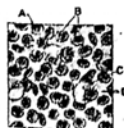
7. Oxygenated blood is found in two chambers of heart including.

- a. Right and left atrium
- b. Right and left ventricles
- c. Right atrium and right ventricle✓
- d. Left atrium and left ventricles

8. Which component of blood is liquid?

- a. Plasma✓
- b. Red Blood cell
- c. White blood cell
- d. Platelets

9. The diagram shows different types of blood cells which cell is filled with haemoglobin?



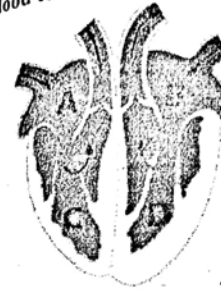
a. A✓ b. B c. C d. D

Focus Student Resource Book

(253)

General Science -7

10. The diagram shows blood flow through a human heart which chamber pumps the blood to lungs?



- a. A
- b. B✓
- c. C✓
- d. D

B. True and False (Correct the statement if it is false)

1. Breathing is a chemical reaction and cellular respiration is a physical process.

(False)

Breathing is a physical reaction and cellular respiration is a chemical process.

2. Blood clotting requires platelets in the blood.

(True)

3. Anaerobic respiration release large amount of energy.

(False)

Aerobic respiration releases large amount of energy.

4. Thick walls of alveoli help in the exchange of gases.

(False)

Thin walls of alveoli help in the exchange of gases.

5. Most veins carry blood rich with Oxygen and food.

(False)

Most arteries carry blood rich with oxygen and blood

C. Short Questions

Q1. Can cells survive without energy?

Ans. No, cell cannot survive without energy. Cell use glucose to get energy

Q2. Arrange these words in such a way as to show how oxygen from air reaches into your blood, nasal cavity, bronchioles, blood capillaries, air, alveoli, bronchi, nostrils, trachea.

Ans. Oxygen from air reaches into your blood through

- 1- Air
2. Nostrils
3. Nasal cavity
4. Trachea
5. Bronchi
6. Bronchioles
7. Alveoli
8. Blood capillaries

Q3. Which substances are transported in blood?

Ans. Water, nutrients, gases, waste and chemicals (hormones, ion etc) are transported by blood from one part of the body to another.

Q4. Differentiate between

Artery	Vein
Artery is blood vessels that carry blood away from the heart to other parts of body	Vein is blood vessels that take blood from cell back to the heart
They have thick muscular walls	They have thin muscular walls
They carry oxygenated blood except pulmonary artery	They carry deoxygenated blood except pulmonary vein

b. Atrium and Ventricles

Atrium	Ventricle
The atrium forms the smaller portion of the heart.	Ventricles form the larger portion of the heart.
It is the upper half of the heart.	It is the lower half of the heart.
The walls of the atrium are thinner than the ventricles.	The walls of the ventricles are much thicker compared to the auricles.
It has lower blood pressure.	It has higher blood pressure.

Q5. How the blood circulates around the body?

Ans. Blood circulate around the body through the circulatory system. It pumps blood from the heart to the lungs to get Oxygen. The heart then sends oxygenated blood through arteries to the rest of the body. The veins carry de-oxygenated blood back to the heart to start the circulation process over.

Q6. Compare respiration and breathing?

Breathing	Respiration
It is a physical process involving exchange of oxygen and carbon dioxide.	It is a biochemical process involving reaction of glucose with oxygen to produce carbon dioxide and water
Energy is not released	Energy is released

takes place outside the cells	It takes place within the cells
Enzymes are not involved	Respiratory enzymes are involved

D. Long Questions

1. Differentiate between aerobic and anaerobic respiration?

Aerobic respiration	Anaerobic respiration
- It requires Oxygen	- It doesn't require Oxygen
- It occurs in the Mitochondria of cells.	- It occurs in the cytoplasm of the cells
- Complete oxidation of glucose takes place	- Glucose molecule is incompletely oxidized
- Lot of energy is liberated (38ATP)	- Small energy is liberated (2ATP)

Q2. How the respiratory and circulatory system work together to provide body cells with the materials they need?

Ans. The circulatory and respiratory systems work together to circulate blood and Oxygen throughout the body. Air moves in and out of the lungs through the trachea, bronchi and bronchioles. Blood moves in and out of the lungs through the pulmonary arteries and veins that connect to the heart.

D. Structured Questions

1. The table shows how the composition of the air changes when you inhale and exhale.

Gas	Amount in inhaled air	Amount in exhaled air
Oxygen	21%	16%
Carbon dioxide	0.04%	4%
Nitrogen	78%	78%
Water vapour	Variable	saturated

a. Why oxygen percentage is reduced in the air that is breathed out?

Ans. Oxygen percentage is reduced in the air that is breathed out because oxygen is used in cellular respiration.

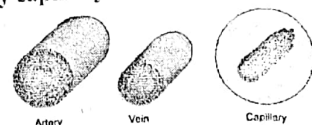
b. Amount of which gas is unchanged and why?

Ans. Amount of Nitrogen gas is unchanged because it is not utilized by our body.

c. Why carbon dioxide percentage is increased in the exhaled air?

Ans. Carbon-dioxide percentage is increased in the exhaled air due to formation of carbon-dioxide in cellular respiration.

2. The following diagram shows structure of artery capillary and vein



a. Which blood vessels can be seen only through microscope?

Ans. Capillaries can be seen only through microscope.

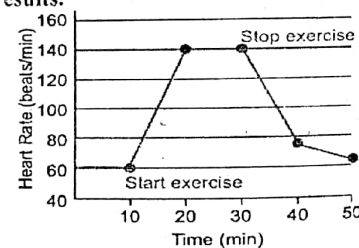
b. Which blood vessels will hold more blood than the other two?

Ans. Arteries will hold more blood than the other two.

c. Why pulse is produced only in arteries?

Ans. Pulse is produced only in arteries because it describes the pressure (contraction) of heart.

3. Anum measure her pulse rate before she exercise. It is 60 beats per minutes and measures her pulse rate again. She then measures it every minute for several minutes. She draws a graph to show her results.



a. Why does her pulse rate keep on increasing during exercise?

Ans. Her pulse rate keep on increasing during exercise due to increase in heart beat.

b. After how many minutes does her pulse rate return to normal?

Ans. After 50 minutes her pulse returns to normal.

c. What can be conducted from her results?

Ans. When she started exercise her heart beat increased as a result pulse rate also increases, but when she stop exercise after 40 minutes her heart beat to 70 pulse rate per minute and after more than minutes (50min), her heart beat came to initial.

Pulse rate and exercise

Heart beat produces pulse in your arteries. Pulse rate is your heart beat rate. You can feel your pulse while placing your fingers below the base of the thumb on your wrist. Using a watch, count the number of pulses per minute. Now you know that your circulatory system is fulfilling the needs of all cells of your body. Write possible outcomes before performing the next step.

a. If you start jumping or running which cells of your body will need more oxygen?

Ans. If we start jumping or running muscular cells of body will need more energy.

b. How your heart will respond to this challenge?

Ans. Contraction and Relaxation of heart increase as a result heart beat or pulse rate increase.

c. Will your breathing rate show any changes?

Ans. Breathing rate will increase during jumping and running.

d. Do jumping or running for two minutes. Count the number of pulses again.

e. Count your breaths

f. After taking rest for five minutes, count your pulse again.

g. How did the exercise effect your pulse rate?

Additional Questions

Q1. Discuss types of blood cell in detail

Red blood cell	Platelets	White blood cells
Disc shaped with a depression on each side. Contain red hemoglobin	Irregular shaped, small pieces of cell	Different types, sizes and shapes
Carry oxygen from lungs to rest of the body	Stop bleeding by forming clots	Protect your body from germs and harmful things. They make the immune system
Anaemia due to less number of	Dengue fever virus reduces	AIDS virus attacks WBCs and

RBCs or haemoglobin quantity	number of platelets	body immune system fails
------------------------------	---------------------	--------------------------

Q2. Write the composition of Blood?

Ans. The blood is composed of

- 55% plasma
- 1% platelets + white blood cell
- 44% Red blood cells.

Q3. Which types of muscles are present in heart?

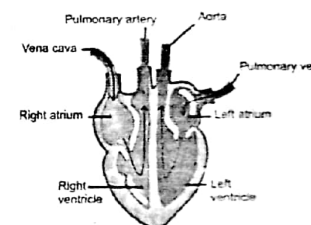
Ans. Our heart is made up of special type of muscle called cardiac muscle.

Q4. How exchange of gases takes place?

Ans. Exchange of Gases:

Oxygen from the inhaled air diffuses from alveoli to the blood in the capillaries. This oxygenated blood is carried to the cells in other parts of the body. The waste product of cellular respiration i.e. carbon dioxide is added to the blood. This deoxygenated blood (blood with less oxygen and more carbon dioxide) reaches lungs. Carbon dioxide from blood capillaries diffuses into alveoli air. Eventually the carbon dioxide is breathed out of the body

Q5. Draw and labelled a structure of heart?



■ Deoxygenated blood ■ Oxygenated blood

Q6. Discuss the structure of Alveoli?

- Alveoli are perfect respiratory surfaces as they:
- are thin walled (single cell thickness)
- have a large surface area
- are moist
- are surrounded by blood capillaries
- have a supply of fresh air

Try it out

Working model of lungs Take a small plastic bottle and remove the bottom portion of it. Cut a large balloon and fix it on the bottom of plastic bottle. Attach a small balloon on the top of bottle and push it inside. Now pinch the large balloon and pull it downwards

What happens to the size and shape of small balloon?

Ans. Pulling down on the balloon at the bottom of bottle explain the process in which diaphragm contracts and the respiratory muscles move outwards, volume increase in the chest cavity (bottle) which lowers air pressure in the lungs (balloons inside the bottle)

Can you relate these two balloons with some parts of your body?

Ans. Plastic bottle = Chest cavity
Balloon inside bottle - Lungs
Balloon covering the bottom of bottle = Diaphragm.

UNIT 3

IMMUNITY AND DISEASES

A. MCQs (Choose the correct option)

1. When the skin is damaged, bacteria enter in our body, Which lines of defence is crossed by these bacteria?

- First lines of defence✓
- Second lines of defence
- Third line of defence
- Fourth line of defence

2. A new born baby has less immunity as compared to other people. The baby has only:

- Innate immunity
- Adaptive Immunity
- Passive Immunity✓
- Innate and natural passive immunity

3. The army of your body has special bullets which can identify the enemy and kill it. These bullets are small proteins called.

- pathogens
- Antibodies✓
- Virus
- Bacteria

4. Third line of defence learns about the enemy and adapts accordingly, it is also called.

- adaptive/learned immunity✓
- Innate immunity
- Passive immunity
- Natural passive immunity

5. Benish is allergic to dust and pollen. Her health issue is a/an

- Infectious disease
- disease due to pathogen
- viral Attack✓
- Non infectious disease

6. Rabies is a very serious threat to health and life of a person. If a rabies infected dog bites a person, the only way to save him is by providing

- Innate immunity
- Adaptive immunity
- Passive immunity✓
- Learned immunity

7. Maximum number of additional defence layers is required for.

- Medical staff✓
- Teacher
- Students
- Lawyers

8. Typhoid and polio spread by faecal oral route. If we want to prevent such diseases in our area we should

- Control mosquitoes
- Control air pollution
- Improve hospitals
- improve sanitation and hygiene condition.✓

9. Respiratory system related diseases mostly spread through

- Water
- Food
- Blood
- Droplets in air✓

10. Which of these can provide you with long term immunity against infection diseases?

- Antibiotics✓
- Vitamins
- vaccine
- Red Blood cell

B. Short Questions

Q1. Which line of defence acts last in immune response? List its components?

Ans. Third line of defence (Adaptive or learned immunity).

It identifies the germ and start making special type of white blood cells i.e. T-cells and B-cells.

T-cells (Kill the virus of infected cells)

B-cells (makes antibodies)

These antibodies defends itself against harmful or foreign substance is called immune system.

Q2. Which line/s of defence is/are not concerned with recognition of the pathogen intruder?

Ans. First line of defence is not concerned with recognition of pathogen intruder. For example, skin it protects us from pathogens can't recognize them.

Q3. Some harmful chemical can make you sick but chemicals are not included in the list of pathogens. Why?

Ans. A Pathogen is a biological agent that causes disease or illness to its host. Pathogens are living agents. Chemicals are non-living substances. So chemicals of pathogens can't

cause illness but chemicals itself are not called pathogens.

Q4. Adaptive immune response increases with time. Why?

Ans. Adaptive immune response increases with time because the adaptive immune response is mediated by lymphocytes. These are B and T cells. After destruction of pathogen, B-cells become memory cells, which help the body 'remember' the disease and prevent re-infection.

Q5. People throughout the world have become focussed on improving immune system from March, 2020, why?

Ans. People throughout the world have become focussed on improving immune system from March, 2020 because the pandemic of COVID-19 became a threat for them and millions of people died due to COVID-19. Doctors said the only way to protection is a strong immune system so all the people focussed on improving immune system.

C. Long Questions

Q1. Explain different types of immunity?

Immunity:

Immunity means powerful army that protect us from various types of threat.

Types of immunity:

The types of immunity are given below.

- Innate immunity
- Adaptive immunity
- Passive Immunity

a. Innate immunity:

Innate immunity or non-specific immunity is the natural defence of body against any intruder.

Component:

- First line of defence.
- Second line of defence.

First line of defence:

Stop entry of germs in the body. It includes skin and mucus membrane of mouth, nose and lungs etc.

Second line of defence:

It includes some white blood cells, chemicals and fever. These, act after germs enter into the body. All these factors kill germs and protect the body.

b. Adaptive immunity:

Adaptive or learned immunity includes the third line of defence. It identifies the germ and start making special type of white blood cells i.e. T-cells and B-cells.

- T-cells (kills the virus infected cells).
- B-cells (make antibodies)

The antibodies defends itself against harmful or foreign substance is called immune system.

c. Passive immunity:

The types of immunity by already prepared vaccine are called passive immunity. e.g. Vaccine for snake bite etc.

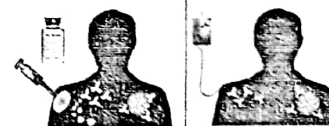
Q2. Explain the mechanism of antibody formation?

There are two ways to start antibody formation by your immune system. Either you get disease or you get vaccination. Your immune system requires exposure of pathogen to activate and start antibody formation. A vaccine works by training the immune system to recognize and fight pathogens. To do this some part from the pathogen must be introduced into the body to trigger an immune response. Vaccine can be in the form of oral drops e.g., Polio vaccine or injection e.g., Covid-19 vaccine. B and T cells form memory cells as well. These memory cells remember their enemies. Next time, when the pathogen enters these two types of memory cells become active immediately and start killing pathogens. This quick immune response assures that pathogen will be unable to grow in the body and cause disease. So if you are vaccinated against Polio, then after the entry of Polio virus in your body your immune response will kill all Polio viruses. You will stay healthy and protected from diseases

D. structured Questions

1. Differentiate between active and passive immunization

Active Immunization Passive Immunization



a. Which immunity is produced by a person's own immune system?

Ans. Active Immunity is produced by a person's own immune system.

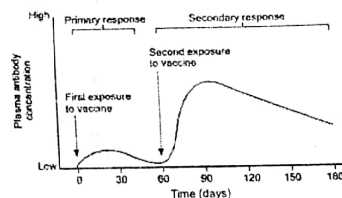
b. Which type of immunity is provided by already prepared antibodies?

Ans. Active immunity is provided by already prepared antibodies.

c. Which type of immunity will protect for long period of time?

Ans. Active immunity will protect for long period of time.

2. The graph shows immune response after first and second dose of vaccination. Primary response is produced after first dose and secondary response is produced after second dose of vaccination. Analyse the graph and response.



a. Which response is capable of controlling disease effectively?

Ans. Immune response is capable of controlling disease effectively.

b. Which response is slow to develop antibodies?

Ans. Immune response is slow to develop antibodies.

c. What is the importance of booster dose of vaccination?

Ans. The importance of booster dose of vaccine is to develop immunity against disease.

d. What will happen if the pathogen of this disease enters in the body at day 90?

Ans. If the pathogen of this disease enters in the body at day 90, the viruses, bacteria and microbes multiply and cause severe infection which lead to the damage of cell in the body and sign and symptoms appear.

e. What will happen if the pathogen of this disease enters in the body at day 0?

Ans. If the pathogen enters in the body at day 0, the cell produce antibodies. Antibodies attack to an antigen and destroy the pathogen.

Additional Questions

Q1. What do you know about Hepatitis - B?

Ans. Hepatitis-B

Cause:

Hepatitis B virus

Symptoms:

- Low grade fever
- Loss of hunger
- Nausea
- Vomiting

- Stomach pain
- Weakness

Spread through:

- Blood & Body fluids
- Multiple use of syringes, needles, razors, dental and surgical instruments,
- Transfusion of blood

Diagnostic Test:

- Blood test for presence of Hepatitis B virus

Prevention:

- Vaccination
- Single use of disposable syringes, needles etc.
- Proper disinfection of dental and surgical instruments
- Screening before blood donation

Q2. What do you know about typhoid?

Typhoid

Cause:

Salmonella typhi bacteria

Symptoms:

- High grade fever
- Headache
- Stomach pain
- Weakness
- Dizziness
- Loss of hunger

Spread through:

- Faecal oral route
- Ingestion of food/ drink contaminated with faeces/urine of typhoid patient.

Diagnostic Test:

- Blood culture test for presence of typhoid bacteria

Prevention:

- Vaccination
- Wash hands properly after using toilet and before handling food
- Eat freshly prepared and properly cooked food
- Drink boiled/ bottled water

Q3. What do you know about COVID - 19?

Ans.

COVID-19

Cause:

COVID-19 virus

Symptoms:

Slight: Fever, Cough Cold
Body pains Fatigue
Severe: Respiratory, Difficulty Pneumonia

Kidney failure

Spread through:

- Direct contact
- Breath droplet
- Coughing
- Sneezing

Diagnostic Test:

- Test of sample from nose, throat or saliva to check presence of COVID-19 virus

Prevention:

- Vaccination
- Social distancing
- Face mask
- Use of sanitizer
- Wash hands with soap often
- Avoid crowded indoor gatherings

Q5. What do you know about Dengue?

Ans. Dengue

Cause:

Dengue virus

Symptoms:

- High grade fever
- Severe headache
- Pain behind eyes
- Nausea Vomiting
- Skin rash
- Body pains
- Weakness

Spread through: Bite of Aedes mosquito

Diagnostic Test:

Blood test for presence of virus

Prevention:

- Use mosquito repellents, mosquito nets, mosquito killing sprays etc.
- Wear fully covered clothes
- Drain all standing water sites as these are breeding area of mosquitoes

Q5. Discuss ways to boost your immunity?

Ways to boost your immunity

- Eat lots of fruits and vegetables.
- Drink plenty of water.
- Exercise regularly and maintain healthy weight.
- Get a good night's sleep.
- Stay hopeful, happy and connected with family and friends.
- Wash your hands more often and keep yourself clean.

- Avoid fried foods, sugar, smoking, drugs etc.
- Get recommended vaccination

Q6. What is maternal Passive immunity?

Ans. You get passive immunity naturally from your mother. Before birth, antibodies are passed through the placenta to protect the child from illness. After birth, an infant receives antibodies found in mother's breast milk. It is also called maternal passive immunity.

UNIT 4 PHYSICAL AND CHEMICAL CHANGES

A. MCQs (Choose the correct option)

1. Which of the following is an example of physical change?

- a. Mixing baking soda and vinegar causes bubbles
- b. Chopping of log✓
- c. Burning a paper with a lighter
- d. Baking a birthday cake for your mouth

2. Which of the following is an example of chemical change?

- a. Filling up a balloon with air
- b. Freezing of water.
- c. Photosynthesis.✓
- d. Boiling of water.

3. Which change can be easily reversed?

- a. Chemical Change
- b. Physical change
- c. Both Physical and chemical changes✓
- d. Neither a physical nor chemical change.

4. When a new substance is formed with properties different from the ones it was formed

- a. Chemical change✓
- b. Physical change
- c. Freezing
- d. Boiling

5. If the chemical properties of a substance remain unchanged and only the state changes it is called a.

- a. Chemical Change
- b. Physical change✓
- c. Both Physical and chemical changes
- d. Neither a physical nor chemical change.

6. Which of the following is an example of a physical change?

- a. Metal rusting
- b. Silver tarnishing
- c. Boiling of water✓
- d. Burning of a paper

7. What best describes a physical change?

- a. Composition changes✓
- b. Composition stays the same
- c. State stays the same.
- d. Mass is lost

8. Which of the following is an example of chemical change?

Focus Student Resource Book

(260)

- a. Water Freezes b. Wood is cut
c. Bread is baked d. Wire is bent

9. Rusting can be prevented by

- a. Scratching b. Painting
c. Washing d. Cleaning

10. Milk turns sour, this is a

- a. Physical change b. Chemical change
c. Physical Property d. Chemical Property

B. Short Questions

Q1. Why is boiling of egg a chemical change and boiling of water is Physical change?

Ans. Boiling of egg Chemical change:

In case of boiling of eggs, the composition of egg changes. New substance is formed and the change is irreversible.

Boiling of water is a Physical change:

Boiling of water to form water vapours is a physical change.

Q2. What is Chemical Property?

Ans. A Chemical property is a characteristic of a particular substance that can be observed in a chemical reaction.

Q3. Define the chemical property called rusting?

Ans. A chemical property of Iron that is capable of combining with Oxygen to form Iron Oxide is called Rusting.

Q4. What is flammability? Identify examples of flammable matter.

Ans. The ability of combustible material that can burn in air is called flammability.

Example:

- Gasoline
- Acetone
- Alcohols
- Hand sanitizer etc.

Q5. Why silver gets transmitted after some time?

Ans. When silver is exposed to sulphur containing gases in the air, it discolour and then darken as it reacts with the gas to form a surface layer of tarnish. This process is called tarnishing.

C. Long Questions

1. Distinguish between Physical and chemical changes. State with at least two examples from daily life.

Physical change	Chemical change
- A physical change is the change of matter	- A chemical change is the change of chemical

General Science -7

that occurs without changing the chemical composition of matter.

- It is usually reversible
- New products are not formed

Example

- Melting
- Boiling

composition of matter.

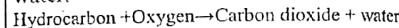
- It is usually irreversible
- New products are formed

Example

- Rusting a metal
- Baking a cake

Q2. Describe combustion with the help of word equation? Explain the harmful effects of combustion on the environment?

Ans. The combustion of hydrocarbon in the presence of Oxygen gives Carbon-dioxide and water.



Harmful effects of Combustion:

- Air pollution
- Water pollution
- Climate pollution
- Asthma
- Acid rain when released particles mixed with rain.
- Headache, fatigue etc.

3. What is rusting? Suggest any three ways to prevent the rusting of iron?

Rusting:

A chemical property of Iron that is capable of combining with oxygen to form Iron oxide is called Rusting.

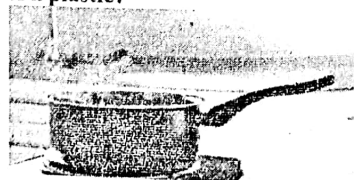
Way to prevent the rusting of Iron:

Rusting can be prevented by.

1. Galvanizing: Iron metal is coated with Zinc.
2. Enamelling: The iron surface is baked with a mixture silicate at high temperature.
3. Use oil and grease or paint.

D. Structure questions

1. Why is the pan made of metal and handle of a plastic?



Ans. The pans are made of metals because metals are good conductor of heat while handle

Focus Student Resource Book

(261)

of a pan is made of plastic because plastic is an insulating that doesn't allow the heat to flow from pan to handles so that it will be easy to hot the frying pan.

2. In the process of making chapatti, there are 2 steps from A to B to C

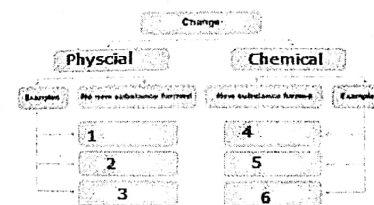
Which stage is a physical and chemical change? Give your reason also



Ans. Stage a and b are physical changes because physical change depends on a shape, size, state etc and we can change the shape of chapatti in stage a and b means it is reversible change.

While stage c baking of chapatti is a chemical change because it is an irreversible change.

3. Complete the following flow chart



1. Boiling of water
2. Freezing of ice
3. Chopping of log
4. Rusting
5. Photosynthesis
6. Respiration

Q4. When a candle is burned both physical and chemical changes take place.

a. Identify and explain the changes.

Ans. When a candle is burned both physical and chemical changes take place.

a. Physical change:

On heating, candle wax gets melted. Since it again turns into solid wax on cooling, so melting of wax and vaporization of melted wax are physical changes.

b. Chemical changes:

The wax near flame burns and gives new substances like Carbon-dioxide, Carbon soot, water vapour, heat and light.

b. Give another similar example where both physical and chemical changes take place?

Ans. LPG is another example of familiar process in which both the chemicals and physical changes take place. LPG is present in liquid form in the cylinder. When it comes out

General Science -7

of cylinder. It converts into gaseous for which is a gaseous form which is a physical change. When gas burns in air is a chemical change.

Q5. During the process of digestion, proteins are broken down into amino acids molecules (you must have read it in the chapter on digestion in grade 6)

a. Is digestion a chemical change? How do you know?

Ans. Digestion is a chemical change because during digestion proteins, get converted into peptides by pepsin in stomach and get converted into peptones in small intestine by trypsin, finally peptides and peptones get converted into amino acids.

b. Identify the process in plants where a chemical change takes place. Justify your answer?

Ans. Photosynthesis is the process on plants where a chemical change takes place because here the chemical reaction involved i-e water and carbon-dioxide combine to form glucose and oxygen since new chemicals species are formed photosynthesis, clearly chemical change.

Q6. Combustion takes place in the internal combustion engine of a car. What burns in the engine to release energy for the car to move? Can it burn without air or oxygen?

Ans. Combustion, also known as burning is the basic chemical process of releasing energy from a fuel and air mixture. In an internal combustion engine, the ignition and combustion of the fuel occurs within the engine itself. The engine then partially converts the energy from the combustion to work.

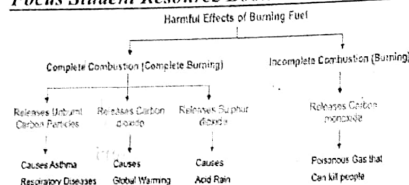
Q7. Melting of butter is a change where a substance changes from solid to a liquid state?

Write a few more examples

- Ice to water
- Rock to lava
- Metals to molten liquids
- Solids glue to melted glue etc

Additional Question

Q1. Discuss harmful effects of burning fuels?

**Q2. Discuss tarnishing of silver?**

Ans. Silver objects get a black coating over time when they are exposed to air (i.e. polished silver articles gradually blacken). This is due to traces of hydrogen sulphide (H₂S) in the air, which reacts with a silver (Ag) to form 2 black silver sulphide (Ag₂S). The word equation for a chemical reaction is:

Silver + Hydrogen Sulphide + Oxygen → Silver Sulphide + Water

Q3. Define solubility?

Ans. Solubility is the maximum of solute that can be dissolved in a certain quantity of solvent at a particular temperature.

Q4. Why it is difficult to freeze on the roads in snowy area?

Ans. In place where heavy snowing takes place, a salt solution is sprayed on the road, salt lowers the freezing point, therefore, making it difficult for water to freeze on the roads.

Q5. What do you think why copper is used for making wire and gold is used for making jewellery?

Ans. Copper is used for making wires because it is highly ductile in nature. It is a good conductor of electricity while gold is used for making jewellery because gold does not tarnish, rust or corrode. Due to its wonderful qualities and luster, so it is an important metal in making jewellery.

Activity 4.3**Thermal conduction**

- Take three spoons of different materials: metal, plastic and wood
- Scoop butter in all three spoons
- Immerse the spoons in glasses with boiling water
- Record your observation

Where did you see the butter melt first? Why do you think this happened?

Ans. Butter melts in spoon of metal first because metals are good conductors of heat but

other two plastic and wood are insulators and can't transfer heat.

UNIT 5

STRUCTURE OF AN ATOM

A. MCQs (Choose the correct option)**1. Neutrons carry**

- a. No electric charge ✓
b. Positive charge
c. Negative charge
d. Unit Charge

2. The smallest particle of an element is,

- a. Molecule
b. Atom ✓
c. Cell
d. DNA

3. Carbon has a mass number of 12. It has protons and neutrons.

- a. 6, 6 ✓
b. 12, 6
c. 12, 12
d. 6, 12

4. The Nucleus of an atom contains

- a. Protons, electrons and neutrons
b. Electrons and Protons
c. Protons and electrons
d. Protons and Neutrons ✓

5. Protons carry:

- a. Positive charge ✓
b. Negative Charge
c. No charge
d. Zero charge

6. The atomic number of an element tells the number of:

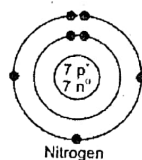
- a. Electron and Neutrons
b. Protons only ✓
c. Protons and Neutrons
d. Neutrons only

7. If the atomic mass of nitrogen is 14, and it has 7 neutrons, how many electrons does a nitrogen atom have?

- a. 8
b. 6
c. 14
d. 7 ✓

8. The mass number of an atom is represented by

- a. A ✓
b. B
c. Z
d. M

9. Nitrogen is an element with the symbol N and the atomic number is 7, its electronic configuration is represented as

Nitrogen

- a. 2, 5 ✓
b. 2, 6
c. 5, 2
d. 2, 2

10. What is the sequence of the elements in the periodic table, ${}_3\text{Li}$, ${}_4\text{Be}$, ${}_2\text{He}$, ${}_7\text{N}$

- a. He, Li, Be, N ✓
b. N, Li, Be, He
c. He, N, Li, Be
d. N, He, Li, Be

B. Short Questions**Q1. An atom has an atomic number of 8 and a mass number of 16.****a. Determine the number of protons present in it.**

Ans. There are 8 protons in this atom

b. Determine the number of neutrons present in it.

Ans. There are 8 neutrons in this atom.

c. Determine the number of electrons present in it.

Ans. There are 8 electrons in this atom.

Q2. Find the meaning of periodic from the dictionary.

Explain the arrangement of elements into periods and groups in a periodic table.

Meaning of Periodic:

Periodic means reoccurring at regular intervals.

Arrangement of elements in periodic table:

Elements are arranged in increasing number of atomic numbers. Elements can be arranged as

* Periods * Groups

Period:

Horizontal rows are called periods. There are seven periods present in the periodic table.

Groups:

Vertical columns are called groups.

There are 18 groups present in the periodic table in which eight groups are normal elements (A-block), others are transition elements (B-Block).

C. Long Questions**Q1. What is an atom? Describe the structure of an atom in terms of protons, neutrons and electrons. Explain with the help of an example that an atom is electrically neutral?****Atom:**

The smallest particle of matter is called Atom.

Structure of atom:

An atom consists of two regions i.e. nucleus and orbit.

The centre of an atom is called nucleus. The nucleus contains protons and neutrons. Protons carry positive charge, neutrons carry no charge, means they are neutral. The other region is orbit in which negatively charged electrons revolve around the nucleus.

Electron, protons, and neutrons are called subatomic particles.

Atom is neutral: The number of protons and electrons of an atom is always the same, which makes an atom a neutral entity.

Q2. How is the periodic table a way to organize elements in a systematic manner? What are the rows and columns of the periodic table and how are they helpful?

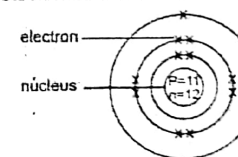
Ans. Elements are arranged in increasing number of protons or increasing atomic numbers.

Rows: Horizontal rows are called periods that show the same number of shells for the elements. There are seven periods in the periodic table.

Groups: Vertical columns are also called groups, there are 18 groups and they have different properties. Out of these 18 groups, 8 are normal groups (A-block) and 10 are transition metals (B-block) elements.

Organize the periodic table in a systematic manner:

The periodic table is important because it is organized to provide a great deal of information about elements and how they relate to one another in the essay - to - use reference. The table can be used to predict the properties of elements even those that have not yet been discovered.

D. Structured Questions.**1. The diagram shown on the right is the structure of an atom.****i. Recognize the atom**

Ans. Na (sodium)

ii. How many electrons are there in this atom?

Ans. Eleven (11)

iii. What is the electrical charge on an electron? Choose from Negative, neutral, positive)

Ans. Negative

iv. Give the names to the different levels of the electrons around the nucleus?

Ans. K, L, M, N, O, etc

2. The Nucleus of an atom contains two types of particles?

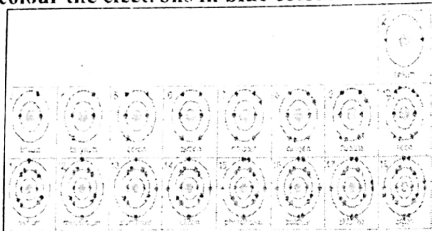
i. What are the names of these two types of particles?

Ans. Proton and Neutron

ii. What is the electrical charge in the nucleus of an atom?

Ans. Positive charge.

3. With the help of given diagram draw the electronic arrangement if the first eighteen element showing the number of electron, protons and neutrons. Write the number of protons and neutrons in the nucleus and colour the electrons in blue colour.



Activity 5.1

Finding number of protons, electrons and neutrons

An atom has an atomic number 9 and a mass number 19.

1. Determine the number of protons present in it

The number of proton present in it is 9

2. Determine the number of neutrons present in it (Hint (mass number) - protons = neutrons)

Ans. The number of neutron = $19 - 9 = 10$

3. Determine the number of electrons present in it

Ans. The number of electron present in it is 9.

Additional Questions

Q1. Define electronic configuration?

Ans. The distribution of electrons in their shells is called electronic configuration.

Q2. Define atomic number?

Ans. The number of protons or electrons in an atom is called proton number or atomic number. It is represented by Z.

Q3. Define mass number?

Ans. The number of protons and neutrons together is the mass number of an atom and it is represented by A.

Q4. Discuss the formula of electric configuration?

Ans. The distribution of electrons is calculated by a formula $2n^2$, where n is the number of the

shells

Number of electrons in shell

K-shell = $2(1)^2 = 2$ e's

L-shell = $2(2)^2 = 8$ e's etc

Q5. Define octet?

Ans. The maximum number of electrons which can filled in the outermost shell is eight. This is called octet.

Q6. Define duplet?

Ans. The maximum number of electrons which can filled in the outermost shell is two. This is called duplet.

UNIT 6 CHEMICAL BONDS

A. MCQs (Choose the correct option)

1. The valency of Nitrogen is 3 and that of hydrogen is 1. The Chemical formula of ammonia is

- a. NH b. NH_2
c. NH_3 ✓ d. NH_4

2. During the formation bonds, metals tend to:

- a. Gain electrons b. Lose electrons ✓
c. Gain Protons d. Lose Neutron

3. Electrostatic attraction occur between two.

- a. Neutral atoms
b. Ions of opposite charge ✓
c. Ions of similar charge
d. Bonded atoms

4. The electrons involved in bonding are found in.

- a. Closest to the nucleus b. In the Nucleus
c. In the outermost shell. ✓ d. Innermost shell.

5. An atom that has 6 out of 8 electrons in its outermost shell will.

- a. Give up to 2 electrons
b. Gain 2 electrons ✓ c. Give up 6 electron
d. Considered stable and not react with other elements

6. A Negative ion is formed when an atom has:

- a. Gained a proton b. Gained an electron ✓
c. Lost a proton d. Lost an electron

7. Aluminium oxide is formed from aluminium ion (Al^{3+}) and an oxide ion (O^{2-}). The formula of aluminium oxides is?

- a. AlO b. AlO_2
c. Al_2O_3 ✓ d. Al_2O_2

8. The atomic number of hydrogen atom is one. The number of valance electron in hydrogen atom is.

- a. 0 b. 1 ✓
c. 2 d. 3

9. The elements of group II Loses

- a. One electron b. Two electrons ✓
c. Three electrons d. don't lose electron

10. A chemical formula is used to describe the types of

- a. Ions and their numbers
b. Atoms and their numbers
c. Molecules and their numbers
d. Valance electrons and their numbers ✓

B. True of false (Correct the statement if it is false)

1. Opposite charges attract each other

True

2. Ions with same charges are held together by electrostatic force of attraction between them.

False

Ions with opposite charge are held together by electrostatic force of attraction between them.

3. Chemical formula are used to describe the types of atoms only.

False:

Chemical formulas are used to describe the types of valance electron and their numbers.

4. The combining capacity of an atom to form a compound is called it valency?

True:

5. Chemical bond formed as a result of attraction between nuclei and valance electrons.

False:

Chemical bond formed as a result of attraction between valance electrons of different atoms.

C. Short Questions

Q1. Why the valency of group II elements is 2?

Ans. The valency of group II elements is +2, because group elements has two electrons in their outermost shell and can lose there electrons.

Q2. By using valency, write the chemical formula of carbon dioxide?

Ans. The chemical formula of carbon dioxide is CO_2 .

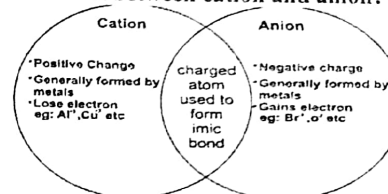
Q3. In the formation of an ion, why magnesium atoms loses two electrons?

Ans. Magnesium belongs to group II-A and has two electrons in their outermost shell. Magnesium can lose two electrons and form Magnesium ion (Mg^{+2}).

Q4. How could you relate the formation of chemical bond with valance electrons?

Ans. The valance electrons are involved in bonding of one atom to another and are able to interact with each other atoms to form chemical bonds.

Q5. With the help of venn diagram compare and contrast between cation and anion?



Q6. Briefly explain the formation of chemical bonds as a result of electrostatic force of attraction between atoms?

Ans. When two atoms interact with each other, they experience a force of attraction. Electrons have a negative charge and the nuclei have positive charge. The nucleus of one atom attracts the electron of other atom. When atoms come close to each other, the distance between the atom decreases. This electrostatic attraction holds the two atoms together and form chemical bonds.

Q7. How the H^{+1} Ion and O^{2-} ion different from each other?

Ans. H^{+} ions is a cation because hydrogen has one valance electron and carry positive charge i-e H^{+} ions while O^{2-} is an anion because Oxygen has two valance electrons and carry negative charge i-e O^{2-} .

D. Long Questions

Q1. Write the steps for writing a chemical formula. Illustrate with few examples?

Steps for writing chemical formula:

1. Write down the symbols of the elements.
2. Above each symbol write its valency.
3. Cross the valency of both elements.
4. If the valency can be simplified, divide them by the least valency.

5. Write the chemical formula.

How to write chemical formula

1. NaCl Na: Group IA

Cl : Group VII A

2. H_2O

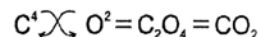
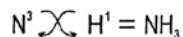
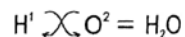
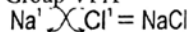
H: Group IA
O: Group VI A

3. NH_3

N: Group VA
H: Group I A

4. CO_2

C: Group IVA
O: Group VI A



Q2. How chemical bond is formed? Explain in detail with the help of an example?

Ans. Atoms either share or gain or loss electrons to attain stable electronic configurations. Due to this, a state of minimum energy is obtained and chemical bond is formed. This result in maximum stability.

Example:

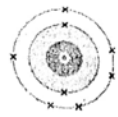
1. A bond between sodium chloride, NaCl is an ionic bond in which sodium atom belong to group I, lose one electron to form Na^+ ion and Chloride atom belongs to group III gain one electron converts to Cl^- . Then these two atoms combine with each other form ionic bond (Chemical bond).

E. Structured Questions

1. Complete the table

Element	Atomic number	Electronic distribution	Outer most electrons	It forming a compound the atom	Valency
Nitrogen	7	2, 5	5	gain 3 es	-3
Beryllium	4	2, 2	2	Lose 2 es	+2
Neon	10	2, 8	8	No gain/loss	zero
Magnesium	12	2, 8, 2	2	Lose 2 es	+2
Lithium	3	2, 1	1	lose 1 es	+1
Helium	2	2	2	No gain/loss	0

2. Magnesium and oxygen react to form magnesium oxide (MgO). The electronic arrangement for the two elements is:



a. Answer these questions about magnesium atom.

i. Does it gain or lose electrons to form an ion?

Ans. It loses electrons to form Mg^{+2} ion.

ii. How many electrons are transferred?

Ans. Two electrons are transferred.

iii. Is the ion form positive or negative?

Ans. Ion formed is positive ion.

iv. What charge does the ion have?

Ans. The ion have +2 charge (Mg^{+2}).

b. Now repeat (a) but for oxygen atom?

i. Does it gain or lose electrons to form an ion?

Ans. It gain electron to form an ion.

ii. How many electrons are transferred?

Ans. There are two electrons transferred.

iii. Is the ion form positive or negative?

Ans. The ions formed are negative

iv. What charge does the ion have?

Ans. The ions have -2 charge (O^{2-})

3. The four circles below represent atoms of four common elements. Study these carefully and then write the chemical formula of each of the eight molecules shown in the chart. Water (H_2O) has already been done for you.

Hydrogen-H	Carbon-C	Oxygen-O	Nitrogen-N
1)	2)	3)	4)
5)	6)	7)	8)

Ans.

1. H_2O 2. CO 3. O_2 4. NH_3
5. NO 6. NO_2 7. CO_2 8. H_2

Stop and check

1. Which group is likely to lose two electrons?

Ans. II- A group is likely to lose two electrons.

2. The atomic number of Neon is 10. It is in group VIII -A. what will be its valency?
An. Its valency is zero.

Try it out

The elements Hydrogen, lithium and oxygen can form ions. Draw their structures and predict the charge of the ion that each element forms: Atomic number:
Hydrogen: 1, Lithium: 3, Oxygen: 8



Hydrogen ion

Lithium ion

Oxygen ion

Stop and check

What will be the charge on the atom and has gained three electrons?

Ans. The charge on the atom is -3 when atom has gained three electrons.

Try it out

Identify the number of atoms in H_2SO_4 molecule

Hydrogen	Sulphur	Oxygen
2	1	4

Additional questions

Q1. Define valency?

Ans. The combining capacity of the atom to form a chemical bond is called its valency.

Q2. Define ion?

Ans. An atom is a neutral particle, but an electron is added or removed from atom, it becomes charged particles known as ion.

Q3. Define chemical formula?

Ans. The chemical formula is the symbolic representation of the elements that are bonded together in a compound.

**UNIT 7
SOLUTIONS**

A. MCQs (Choose the correct options)

1. The mixture of solid and liquid is called a solution. What is the liquid called?

- a. Solute b. Solvent✓
c. Suspension d. Sediment

2. A solution containing less solute than its capacity to dissolve is:

- a. Saturated b. Unsaturated✓
c. Supersaturated d. Aqueous

3. When the more solute is dissolved in saturated solution, the solution becomes:

- a. a Saturated b. Unsaturated
c. Supersaturated✓ d. Dilute

4. In aqueous solution which of the following is most soluble solute?

- a. Oil b. Sugar✓
c. Chalk d. Sand

5. Choose the most effective factor for increasing solubility in a solution.

- a. Grinding b. Stirring
c. Heating✓ d. Increasing pressure

B. Write True or False (Correct the statement if it is false)

a. The substance in which the substance dissolves and is in greater amount is called a solute.

False:

The substance in which the substance dissolves and is greater amount is called solvent.

b. The amount of solute which dissolves in a given solvent has no upper limit.

False:

The amount of solute which dissolves in a given solvent has limit.

c. Dissolving the solute can be faster by stirring the mixture.

True

d. The chances of solubility between two like substances are more challengeable than the unlike substance.

False:

The chances of solubility between two unlike substances are more challengeable than the like substances.

e. An unsaturated solution is a solution in which the solute has completely dissolved in the solvent leaving no remaining substance.

True:

C. short Questions

Q1. What is the difference between saturated and unsaturated solution?

Ans.

Saturated solution	Unsaturated solution
The saturated solution is if a chemical containing the maximum concentration of a solute dissolved in the solvent.	An unsaturated solution is the solution that has the lesser amount of solute that it can be added more at a given temperature.

Q2. Bilquees was preparing her morning coffee. She adds hot water and sugar to her coffee which fully dissolves and makes it sweeter to taste.

- Is her cup of coffee considered a solution and why?

Ans. Yes, the cup of coffee is considered as a solution because here coffee and hot water mix to gather and makes a solution.

- In the above scenario which one is the solute and which one is the solvent?

Ans. In a coffee cup, coffee is a solute and hot water is a solvent.

Q3. How increase in temperature speed up the dissolving process?

Ans. Increase in temperature speed up the dissolving process because when the temperature increases, solubility increase, hence dissolving process increases.

Q4. What happens when solution becomes supersaturated?

Ans. When the solution becomes supersaturated the amount of solute dissolves in a given solvent has an upper limit. When the temperature of this solution is lowered, the solute became less soluble and crystals are formed.

Q5. In gases, solubility increase with increase in pressure, give a daily life example?

Ans. In gases, solubility increases with increases in pressure.

Example

The solubility of carbon dioxide in soda water bottles increases with pressure, so in opening the bottles of soda water, the gas evolved rapidly and pressure decreases.

Q6. How do natures of solutes have an effect on the solubility?

Ans. Nature of solute also affects the solubility. If a solute is changed and the solvent remain the same, the solubility of the solute also changes.

General Principle:

Like dissolves like.

Explanation:

- Ionic or polar solute dissolves in polar solvent.

- Covalent or non-polar solute dissolves in non-polar solvent.

Example: Sodium chloride in water, olive oil in ethanol

Q7. Khushi added some olive oil to a cup of water. Why a layer of oil formed at the surface of water?

Ans. Khushi added some olive oil to a cup of water. A layer of oil is formed at the surface of water because according to the gases rule of solubility.

'Like dissolves like'

Here oil is non-polar water is polar. So non-polar doesn't dissolves in polar solvent so oil floats on the surface of water and doesn't mix.

Q8. How increase in temperature effects the solubility of gases?

Ans. Increase in temperature decreases the solubility of gases, when most gases dissolves in solution, the heat is released and process is exothermic. Increase temperature increase in Kinetic energy. The higher Kinetic energy causes more motion in the gas molecule which breaks intermolecular bonds and re-enter the gas phase. Thus, as the temperature increases, solubility of a gas decreases.

D. Long Questions

Q1. What is the effect of increasing temperature on the solubility of solid in liquids?

Ans. The effect of temperature on the solubility of a solid solute in liquid is more difficult to predict. Generally, it appear that solubility of solid increases with increasing temperature, but this is not always happening.

1. Solubility of some solute decreases with increase in temperature e.g; CaO

2. Solubility of some solute increase with increases in temperature e.g CaCl₂

3. The solubility of some solute is not effected with increases or decreases in temperature e.g.NaCl and KBr

Q2. Explain the formation of saturated and super saturated solution?

Ans. Formation of saturated solution:

A saturated solution is formed when the maximum amount of solute has been dissolved in the solvent at a given temperature.

Example:

When 40 g is added, 36 g dissolves and 4 g remains un-dissolved, forming a saturated solution.

Formation of supersaturated solution:

A supersaturated solution in the solution in which amount of solute which dissolves in a given solvent has an upper limit. More solute

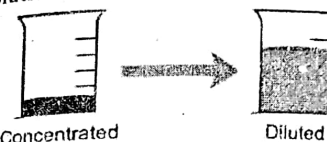
can be added to the saturated solution with an increase in temperature.

Example:

Take a glass of water and put some ice cubes into it. Add a teaspoon full of sugar. The sugar doesn't dissolves but settle on the bottom of the glass. Then take out the ice cubes. After some time when the temperature of water increases then the sugar dissolves. That means the cold water was supersaturated of sugar.

E. Structured Questions

1. Look at the beaker's of concentrated solutions



Amount of solute = 10 ml

Amount of solvent = 20 ml

Colour = Black

How will you change dilute solution to Concentrated solution?



Amount of solute = 10 ml Amount of solute = 20 ml

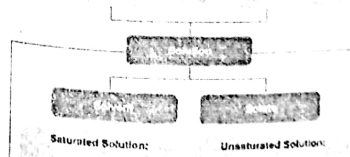
Amount of solvent = 40 ml Amount of solvent = 40 ml

Colour = Purple

Colour = Black

2. (a) Write the definition in the empty Box?

Dilute Solution Concentrated Solution



Dilute Solution

A dilute solution is one in which

Small amount of solute is dissolved in the solvent.

Concentration Solution:

A concentration solution is the one in which relatively large amount of solute dissolved in the solvent.

Solvent:

The substance in which the solute is dissolves and in greater amount.

Solute:

The substance which is present in less amount.

Saturated Solution:

The solution in which maximum Amount of solute has dissolves in the Solvent at a given temperature.

Unsaturated Solution:

The solution in which solute has Completely dissolved in the solvent Leaving no remaining solute.

b. Name the factors affecting the Solubility and how these factors effect it?

Factors affecting the solubility

Nature of solute and solvent	Temperature	Pressure
------------------------------	-------------	----------

Try it out

Identify solvent and solute in the given Solutions.

Solution	Thinning	Sauce
Chocolate milk	Milk	Chocolate
Jelly	Water	Jelly crystals
Vinegar	Water	Acetic acid
Salt water	Water	Salts

STOP AND CHECK

Smoke is an example of solution. Identify the solute and solvent.

Solute = Carbon

Solvent = Air

Activity 7.1

Solution around us

Solutions do not exist only in liquid state. Solutions can be formed in different states.

Focus Student Resource Book

Observe the types of solutions and examples. Identify the solutes and solvents.

gas in gas	air (oxygen dissolved in nitrogen)	oxygen gas	nitrogen gas
gas in liquid	water (oxygen gas dissolved in water)	Oxygen	Water
gas in solid	hydrogen in palladium	hydrogen gas	palladium
liquid in gas	humid air (water dissolved in air)	water	air
liquid in liquid	alcohol (ethanol) dissolved in water	alcohol	Water
liquid in solid	dental filling (mercury dissolved in silver)	Mercury	silver
solid in gas	smoke	Carbon	air
solid in liquid	salt water (salt dissolved in water)	salt	Water
solid in solid	metal alloy (brass) (zinc dissolved in copper)	zinc	copper

STOP AND CHECK

A cup of coffee and cough syrup are examples of solutions. Inquire, what is the difference between these two solutions? Adding washing powder in the washing machine is an example of dilute solution.

Stop and Check

Explore, the solubility of every substance is same or different?

Ans. The solubility of every substance is different.

Additional Questions

Q1. Define solute?

Ans. The substance that dissolves and is present in less amount in solution is called a solute.

Q2. Define solvent?

Ans. The substance in which the solute is dissolved and is greater amount in solution is called a solvent.

Q3. What are the process of dissolving material?

Ans. The process of dissolving material are given below.

- Temperature
- Stirring
- Grinding

Q4. What do you know about acetone?

Ans. Acetone is a liquid solvent that can break down and dissolve other substances. Companies include acetone in products such as nail polish remover, paint remover and varnish remover. Some also use acetone to manufacture plastics, lacquers and textiles.

Q5. Write the difference between dilute solution and concentrated acid solution?

Dilute solution	Concentrated solution
- A solution that has less solute dissolved in the	- A solution that has more solute dissolved in the

(270)

General Science -7

solvent	solvent
- It is less concentrated	- It is more concentrated
- It has less solute	- It has more solute

Activity 7.2

Investigate dilute and concentrated solution Sharbat is favorite drink of kids. Make two glasses of sharbat. Put one spoon of sugar and one spoon of sharbat in glass # 1 and three spoons of sugar and three spoons of sharbat in glass # 2.

INVESTIGATE

Which glass is more tasty and why?

Glass 2 having three spoons of sugar and three spoons of sharbat is more tasty because it has more solute. More solute make sharbat more tasty.

What is the effect of amount of solute and solvent on the sharbat?

Effects:

Solute make sharbat tasty.

Effects of solvent:

Solvent i-e water dissolves more solute in it.

Stop and Check

A cup of coffee and cough syrup are examples of solution. Inquire, what is the difference between two solutions?

Coffee	Cough syrup
Coffee is a solution which contains natural herbs	Cough syrup is a solution which contains synthetic chemicals
There is no use of alcohol in coffee	There is a use of alcohol in cough syrup

UNIT 8

FORCE AND MOTION

A. MCQs (Choose the correct option)

1. SI unit of force is

- a. Kilogram
- b. Centi-second
- c. meter
- d. Newton

2. By dividing distance of a moving body with time, we obtain.

- a. Speed
- b. Mass
- c. Gravity
- d. Force

3. If a body moves for 10 second with speed of 30 m/s then its covered distance is

- a. 30m
- b. 3 m
- c. 300 m
- d. 150m

Focus Student Resource Book

(271)

General Science -7

4. Which of the following animal has highest running speed?

- a. Horse
- b. Turtle
- c. Cheetah
- d. Silver ant

5. Every actions has reaction equal in magnitude but

- a. Opposite
- b. Perpendicular
- c. Parallel
- d. Anti-parallel

6. Unit of speed is:

- a. N
- b. m/s
- c. kg m
- d. kg m/s

7. If a body covers equal distance in equal intervals of time then speed will be.

- a. Increasing
- b. Decreasing
- c. Uniform
- d. Zero

8. You draw distance-time graph for moving car and get straight line parallel to time axis. Then speed of the car is

- a. Increasing
- b. Decreasing
- c. uniform
- d. at rest

9. A Person is swimming in a pool, swimming is an example of?

- a. Action and reaction force
- b. Friction
- c. Gravity
- d. All of these

10. Which of the following is non-contact force?

- a. Gravity
- b. Friction
- c. Spring force
- d. Tension is string

B. True and False (correct the statement if it is false)

1. Action and reaction forces never balance each other.

True:

2. Action and reaction forces act on same body.

False:

Actions and reaction forces act on different body.

3. Force can change direction of motion of the body.

True

4. Distance-time graph of rest car is parallel to time axis.

True:

5. Gravity is non-contact force.

True:

C. Short Questions

Q1. Define average speed. Write SI units of speed?

Ans. Average Speed:

Average speed of a body is equal to total distance covered by body in total time taken by it.

$$\text{Average speed} = \frac{\text{Total Distance}}{\text{Total Time}}$$

Unit: Meter per second (m/s)

Q2. If a cyclist covers 15 kilometres distance in 1.5 hours. What is his speed in kilometre per hour (km/h) and in meter per second (m/s)?

Ans. Speed in kilometre/hour (km/h)

$$\text{Speed} = \frac{\text{Distance}}{\text{Time}}$$

$$= \frac{15 \text{ km}}{1.5 \text{ hours}} = 10 \text{ km/h}$$

Speed in meter per second (m/s)

$$1 \text{ km} = 1000 \text{ m}$$

$$1 \text{ hour} = 3600 \text{ s}$$

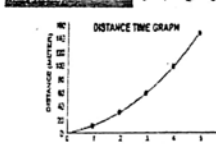
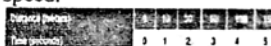
$$\text{So here Distance} = 15 \times 1000 = 15000 \text{ Time} = 1.5 \times 3600 = 5400 \text{ s}$$

$$\text{Speed Distance} = \frac{\text{Distance}}{\text{Time}}$$

$$= \frac{15000}{5400} = 2.78 \text{ m/s}$$

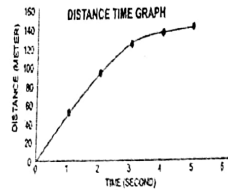
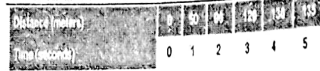
Q3. Draw the distance time graph for increasing speed of the car?

Ans. when object is moving with increasing speed.



Q4. A car is moving with uniform speed. Driver apply brakes to slow it down after some time and finally stops. Sketch distance time graph to represent this motor of the car?

Ans. when object is moving with decreasing speed.



Q5. Explain briefly, why action and reaction forces cannot cancel each other.

Ans. Action and reaction forces cannot cancel each other because they act on different objects.

Q6. How do the birds fly in the sky? Briefly explain with action reaction pair concept?

Ans. The flying of a bird is based on action and reaction force that is on Newton's third law. While flying, the birds push the air down with its wings to get an equal and opposite reaction in the upward direction, which helps the bird in going up and fly smoothly.

Q7. Define force and its SI unit?

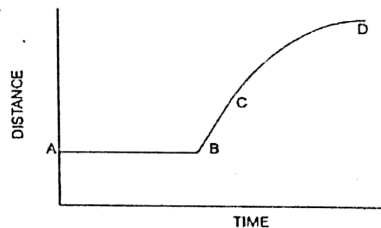
Ans. **Force:**

Force is an agent that pulls or pushes an object.

Unit:

SI unit of force is Newton (N)

Q8. Look at the distance - time graph



a. Which part is representing uniform motion?

Part B to C represents uniform motion.

b. Which part is representing decreasing speed?

Part C to D represents decreasing speed.

c. Which part of the body is at rest?

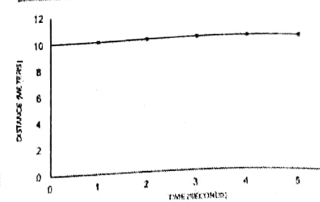
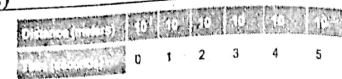
Part A to B represents body is at rest.

D. Long Question

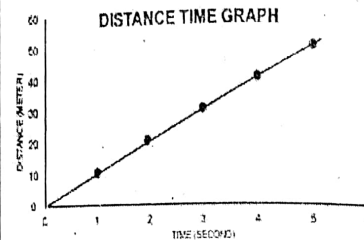
Q1. Draw distance- time graph for

(a) Body at rest,

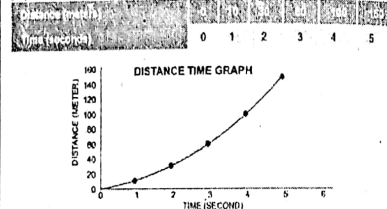
Consider a car is standing at 10 meter away from door for 5 seconds. Look at the data



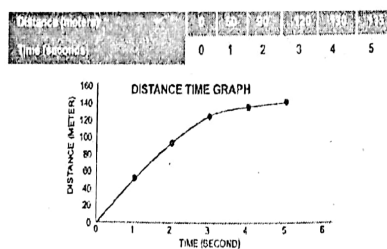
(b) With uniform speed



(c). Moving increasing speed



(d). Decreasing Speed



Q2. Define force and its unit. Give examples to explain different effects of forces on a body?

Force:

Force is an agent that pulls or push an object

Unit:

SI unit of force is Newton (N)

Example:

1. Ball falling straight down due to gravity and footballer kicks to it to his foot, the force

changes direction of balls motion almost perpendicularly.

2. When we push a stroller in a mall, we apply force on it.

3. When we pull a string to tighten up the knot by applying force on it.

Q3. With the help of examples, show that forces act in pair?

Force act in Pair:

Example 1:

A person pushes against a wall (action force and the wall exerts an equal and opposite force against the person (reaction forces)

Example 2: A ball is thrown against a wall the ball puts a force on the wall (action force and the wall puts a force on the ball (reaction force) so the ball bounds off.

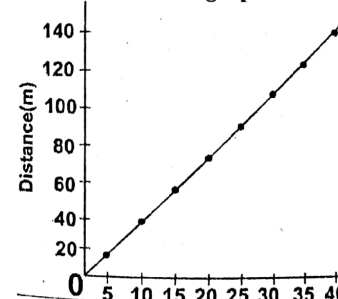
Example 3: A swimmer swimming forward: The swimmer pushes against the water (action force) the water pushes back on the swimmer (reaction forces) and pushes the swimmer forward.

E. Structured questions

1. A car is travelling on the highway. Its distance and time is recorded at different intervals of time (see the table)

Time (second)	0	5	10	15	20	25	30	35	40
Distance (meter)	0	20	40	60	80	100	120	140	160

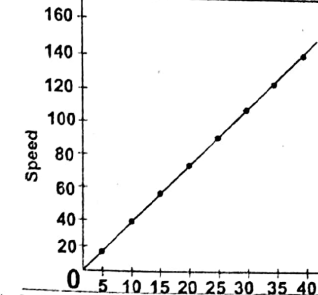
(a) Draw distance- time graph for this car



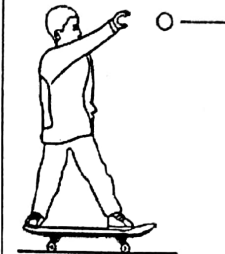
(b) Tell whether it has uniform speed, increasing or decreasing speed. Give reason of your selection.

We see that car is covering equal distance of 20 meter after each 5 seconds. Therefore, car is neither speeding, nor slow down. It has uniform speed.

c. Draw the speed-time graph of this moving car.



2. A boy is standing in the skating field and throws the ball as shown



a. If there is no friction, will the man move? If there is no friction, the man will move.

b. If boy moves then) in which direction he will move? (in the direction of ball or opposite to it). Support your answer with reason.

As we know that every action has a reaction so due to this when the man throws ball in forward direction, the man due to reaction will move in the opposite direction throw.

c. Give an example that matches with the situation of the question?

- Walking on the ground.
- Throwing a ball against a wall
- Balloon rocket
- Propulsion of rocket.

Activity 8.1

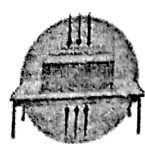
Separate contact and non contact forces
Contact force Non-contact force



FRICTION FORCE



GRAVITY FORCE



NORMAL FORCE



ELECTRIC FORCE



APPLIED FORCE



MAGNETIC FORCE



DRAG FORCE



SPRING FORCE

Now it's your turn, Can you give some examples of action and reaction?

Example 1. A ball is thrown against a wall.

Example 2. A person is driving off a raft.

Example 3. A person pushes against a wall.

Example 4. A Space shuttle pushes out hot gases and hot gases pull force, so shuttle lifts

Additional Question

Q1. Define and explain graph?

Ans. Graph:

Graph represent relation between two or more quantities in the form of diagram.

Graph has two perpendicular line intersecting at the point which is called 'origin'. The

horizontal line is called x-axis and vertical line is called y-axis.

Q2. Define contact force?

Ans. A force that acts only when there is physical contact between two bodies. e.g kicking the football.

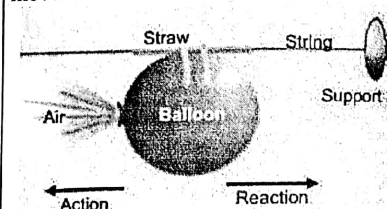
Q3. Define non-contact force?

Ans. Non-contact force is a type of force that acts on the objects, without any physical contact with it.

e.g Gravitational Force.

Q4. Discuss the effect of force in balloon rocket?

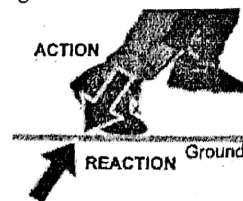
Ans. Balloon Rocket: To make balloon rocket, inflate a balloon. Paste a straw and pass string through the straw. Tie both ends of the string with two supports. When air is released from the balloon as shown. Air releases with an action force in backward direction and balloon moves ahead due to reaction force as shown.



Q5. Discuss the effect on walking in the ground?

Ans. Walking on The Ground:

To walk on the road, we push the ground backward as action and ground then pushes us forward due to reaction. It is how we walk on the ground.



UNIT 9 WAVES AND ENERGY

A. MCQs (Choose the correct option)

1. Hertz (Hz) is the unit of

- a. Mass b. Energy
c. Loudness d. Frequency✓

2. To hear echo, minimum distance between sound and obstacle should be:

- a. 71m b. 17m✓
c. 17cm d. 0.17 m

3. Which of the following is longitudinal wave?

- a. X-rays
b. Waves on stretched rope
c. p- Seismic waves
d. S-seismic waves✓

4. Which has highest pitch of sound?

- a. Lion roar b. Whistling sound✓
c. Train horn d. Traffic Noise

5. If a wave has three crests and three troughs then what is its frequency?

- a. 3Hz✓ b. 1Hz
c. 5Hz d. 6Hz

6. Sound waves cannot pass through:

- a. Solids b. Liquids
c. Gases d. Vacuum✓

7. Which of the following animals has the lowest pitch of sound?

- a. Sparrow b. Dog
c. Cat d. Mosquito✓

8. If frequency of sound is double but amplitude of this sound waves is kept constant, then.

- a. loudness and pitch both increase✓
b. loudness and pitch both decrease
c. loudness increases and pitch remains same.
d. loudness remains same and pitch increases.

9. Which of the following is a longitudinal wave?

- a. Sound wave✓
b. Water waves on surface of ocean
c. Light d. String wave.

10. Product of frequency and time period of waves is.

- a. 1✓ b. 1/T
c. 1/f d. 0

B. True and false (Correct the statement if it is False).

1. In waves, matter is also transported along with energy.

True

2. Sound is a form of energy that travel through a medium as transverse wave.

False:

Sound is a form of energy that travels through a medium as longitudinal waves.

3. High pitch sound means grave sound.

False:

Low pitch sound means grave sound.

4. If you are standing near a loudspeaker then you hear sound waves of large amplitude.

True:

5. Red light has greater speed in air than speed of sound in steel.

False:

Red light has lesser speed in air than speed of sound in steel.

C. short Questions

Q1. Give at least two differences between mechanical waves and electromagnetic waves?

Mechanical waves	Electromagnetic waves
-Mechanical waves cannot travel without a medium	- Electromagnetic waves can travel through a vacuum with the help of any medium.
-Mechanical waves moves slower	- Electromagnetic waves moves as faster as light.
- Example: Sound waves	- Example: Microwaves Radio waves etc

Q2. Differentiate between transverse waves and longitudinal waves. Give at least one similarity and one difference?

Transverse waves	Longitudinal waves
- The practice moves at right angles to the direction of waves propagation	- The particles move horizontally in the direction of wave propagation.
- They are possible only in solids	- They are possible in all types of matter
Example: Vibration in string	Example: Sound waves

Similarities:

Both transverse and longitudinal waves are mechanical waves and transport energy without transporting matter.

Q3. Why do we not hear sounds caused by explosions on the sun?

Ans. We know that the propagation of sound requires a material medium for its propagation and we also know that there is no continuous material medium between sun and earth. Hence

Focus Student Resource Book

(276)

General Science -7

sound cannot travel from sun to earth. That's why we are not able to hear the explosions taking place in the sun.

Q4. Define the following terms

Crest:

It is the portion of transverse wave above the mean position.

Trough:

It is the portion of transverse waves below the mean position.

Rarefaction:

The portion of longitudinal waves in which particles of the medium are spread out is called rarefaction.

Compression:

The portion of longitudinal waves in which particles of the medium are close to each other is called compression.

Q5. If 100 waves (or cycles) of water are passing through a point in the river in 20 seconds, calculate frequency and time period of these waves.

Ans. Given Data:

As 100 waves passes through a point in 20 seconds.

So, number of waves = 100

Time, $t = 20$ sec

Required:

(a) Frequency = $f = ?$

(b) Time period = $T = ?$

Solution:

a. To find frequency:

By definition, frequency (f) in the number of waves passes through a point in one second.

So

In 20 sec = 100 waves passed through a point

In 1 sec = $\frac{100}{20}$ waves passes through a point.

In 1 sec = 5 waves passes through a point

So, Frequency = $f = 5$ Hz

b. To find time period (T).

By definition time period (T) is the time required to complete one vibration

So

100 waves passes through a point = 20 second

1 waves passes through a point

$\frac{20}{100}$ second = 0.2 sec

So, Time period (T) = 0.2 sec

Q6. Waves are produced in stretched string continuously. A crest passes through a point

on it in 1.5 second, what is frequency of waves?

Ans. As we know that, frequency is the number of cycles in one second, $F = \frac{1}{T}$

As one cycle takes 1.5 seconds

Then,

$$f = \frac{1}{1.5} = 0.667 \text{ Hz}$$

Q7. How can a body produce sound? Explain briefly.

Ans. Second waves are produced by a vibrating body. The vibrating object moves in one direction and compresses the air directly in front of it. As the vibrating object moves in the opposite direction the pressure on the air is lessened so that an expansion or rarefaction of air molecule occurs.

Q8. What is pitch of sound? How is it related with the frequency of sound?

Ans. The pitch of sound is determined by the frequency of vibration of the sound waves that produce them.

A high frequency is seen as a high pitch, while a low frequency is regarded as a low pitch.

Q9. What is loudness of sound? Name the factors on which loudness of sound depend.

Ans. Loudness of Sound:

Loudness of sound is the sensation produced by sound on our ears.

Factors affecting loudness of sound:

Factors affecting loudness of sound are;

1. Amplitude of the waves.
2. Surface area of sound waves.
3. Distance from sound.
4. Sensitivity of ear.

Q10. A mobile phone is vibrating in your hand and another mobile is vibrating on a table. Which will be producing louder sound and why?

Ans. Mobile vibrating on table produces louder sound because when the vibrating mobile is brought in contact with the table, the vibration of the mobile is being transmitted to the surface of table whose surface area is very large as compared to the surface area of the mobile and hence sound becomes louder.

Q11. How can you hear echo?

Ans. The feeling of the original sound remain in our brain till 0.1 second, If reflected sound waves reach our ear before the end of 0.1 second, than our brain doesn't recognize the

Focus Student Resource Book

(277)

General Science -7

original and reflected sounds as separate sounds. They are taken as one sound by our brain but if the time gap between the reflected sound and the original sound will be equal to 0.1 seconds we will be able to hear an echo.

Q12. In a cricket ground, batsman hits four in a test match. You notice that hitting sound of the bat is heard slightly after you see the bat actually hitting the ball. Why is it so?

Ans. In a cricket ground, batsman hit four in a test match, yes noticed that hitting sound of the bat is heard slightly after you see the bat actually hitting the ball because velocity of seeing things is faster than velocity of sound.

D. Long questions

Q1. Define the following terms for wave:

Crest,

It is the portion of the transverse waves above the mean position.

Trough,

It is the portion of transverse below the mean position.

Compression,

The portion of the longitudinal wave in which particle of the medium are close to each other is called compression.

Rarefaction,

The portion of the longitudinal waves in which particles of the medium are spread out is called rarefaction.

Wavelength,

It is the distance between two consecutive crests or two consecutive troughs is called wavelength.

Amplitude

It is the maximum displacement of vibrating particle of the medium from mean position when a waves is passing through is called amplitude.

Q2. Show that frequency and time period of waves are inverse of each other.

Frequency:

Number of waves passing through a point in one second is called frequency.

Time period:

It is time taken by a wave to pass through a point in the medium

Relation between frequency and time period of waves:

We know that

$$\text{Frequency (f)} = \frac{\text{Number of waves passing through a point}}{\text{Time taken by waves to pass through a point}} = \frac{n}{t}$$

$$\text{And Time period (T)} = \frac{\text{Time taken by waves to pass through the a point}}{\text{number of wves passing through the point}} = \frac{t}{n}$$

$$\text{Multiply both equation}$$

$$\text{Frequency of waves} \times \text{Time period (T)} = \left(\frac{n}{t}\right) \left(\frac{t}{n}\right) = (f)(T) = 1$$

Frequency of a waves and its time period are inverse of reaction

$$\rightarrow F = \frac{1}{T} \text{ OR } T = \frac{1}{f}$$

Q3. What is Pitch of sound? On what factors it depends?

Ans. Pitch:

Pitch of sound tells us how shrill or grave sound is.

Factor it depends:

Pitch of sound depends in the frequency of the vibrating body.

Pitch of sound $\propto$ frequency of sound

If frequency of vibration of a body increases then shrillness of sound produced by it will increase and sound produced by it will increase and sound will changing from low pitch (grave sound) to high pitch (shrill sound)

Q4. What is loudness of sound? On what factors it depends?

Ans. **LOUDNESS OF SOUND:** "Loudness of sound is the sensation produced by sound on our ears." Two sounds of same pitch (same frequency) may have different loudness. So, this can be defined as "The property of sound which help us to distinguish between a soft sound and a louder sound is called loudness of sound."

Factors Affecting Loudness of Sound 1.

Amplitude of the Wave:

Loudness of sound is related with the amplitude of the wave. Louder sound has greater amplitude and soft sound has small amplitude. So, loudness of sound is directly proportional to amplitude of the wave.

A wave with larger amplitude has a lot of energy added to it by a person or a sound instrument. As a result, we hear a louder sound.

Loudness of sound $\propto$ Amplitude of wave

Example:

If we beat the drum with greater force, its surface will vibrate with greater energy and it will produce louder sound.

2. Surface area of Sound Source:

If the sound source has larger surface to vibrate, it produces louder sound.

Example:

If we strike a large drum and a small drum with same amount of force, then large drum will produce louder sound than small drum.

3. Distance from Sound Source:

If a listener is standing near a sound source, he/she will hear louder sound than the person standing at far off place.

Example:

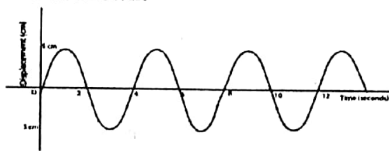
In school morning assembly, students standing near loudspeaker hear louder sound and students standing at the end of the line hear soft sound.

4. Sensitivity of Ear:

Loudness of sound also depends upon condition of ear. Usually, old people cannot listen to soft voices.

E. Structured questions

1. Waves are produced in water pool. A graph is plotted between instantaneous displacement of particles of the medium and time as shown.



a. How many crests and troughs are there?

Ans. There are four crests and three troughs in the above figure.

b. What is amplitude of the wave?

Ans. The amplitude of the wave is 5 cm

c. What are displacements of particles of the wave at time 4 seconds and 11 seconds?

Ans. Displacement of particles of the wave at time 4 seconds is 10 cm and at 11 seconds it is 27.5 cm.

d. How many waves are there?

Ans. There are $3\frac{1}{2}$ waves.

e. What is time period of the wave?

Ans. Time period of the waves is 4 second.

f. What is frequency of the waves?

Ans. The frequency of the waves is 0.25 Hz.

g. If there are 3.5 waves in distance of 7 meters then find the wavelength for these waves?

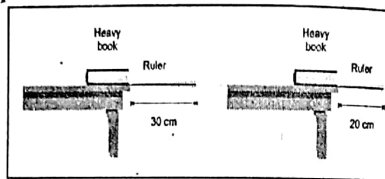
Ans. 3.5 waves = 7 meter

1 waves = ?

By cross multiplying; $3.5 \times ? = 7 \times 1$

$$= \frac{7}{3.5} = 2 \text{ m}$$

2. Consider the diagrams, one end of each ruler is made fixed by placing under heavy books and their other ends are free to vibrate. When the free end of each ruler is plucked with same force then:



a. Which ruler will produce louder sound? And why?

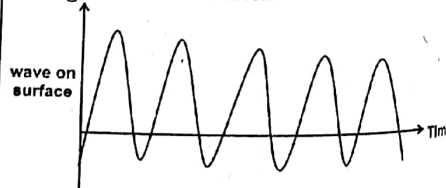
Ans. Ruler with 20 cm produces louder sound because shorter material vibrates faster than longer ones. The faster the rod vibrates, the higher the pitch and louder the sound.

b. Which ruler will produce sound of high pitch?

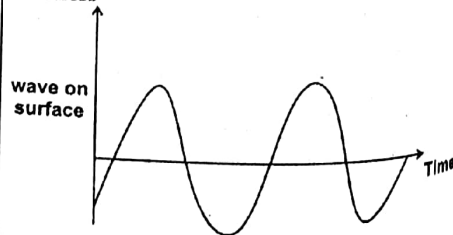
Ans. Ruler with length 20 cm vibrates more and produces sound of high pitch.

3. Draw the wave form/ graphs to differentiate between the situations given below:

i. You talking to a friend & you shouting during the football match



ii. Whistle sound & male voice of same loudness

**UNIT 10****HEAT AND TEMPERATURE**

A. MCQs (Choose the correct option)

1. "J" is the symbol for unit joule, it is the unit of:

- a. Temperature b. Heat✓
c. Power d. Voltage

2. If your class room temperature is 27 °C, what is its value in kelvin scale?

- a. 27 K b. 373 K
c. 300 K✓ d. 246 K

3. Which of the following is the best conductor?

- a. Wood b. Water
c. Metal✓ d. Plastic

4. Which temperature of the followings is representing melting point of ice?

- a. 0 K b. 32° C
c. 273 K✓ d. 0° F

5. Mercury thermometer is used to measure temperature of a body. Which process is used in it?

- a. Convection✓ b. Radiation
c. Thermal expansion d. Insulation

6. Which of the followings is the worst conductor?

- a. Metal b. Wood✓
c. Wool d. Air

7. Conduction of heat best takes place in

- a. solids.✓ b. fluids.
c. gases. d. vacuum.

8. Materials that trap air like fur, wool and saw dust are heat:

- a. Insulators✓ b. Conductors
c. Reflectors d. Convectional devices

9. The heat transfer that occurs due to a density difference in fluids is

- a. conduction. b. radiation.
c. convection.✓ d. insulation.

10. Huge amount of heat is being generated on sun. This heat reaches from sun to earth by

- a. radiation only.✓
b. convection only.
c. convection and radiation.
d. conduction, convection and radiation

B. True and False (correct the statement if it is False):

1. Heat and temperature are two same things.
False

Heat and temperature are two different things.

2. Only Radiations can pass through vacuum.

True

3. On heating, solids expand more than liquids.

True

4. At hot end of a metal rod, its particles vibrate faster than its colder end.

True

5. In double glazed windows, heat can flow from room to outside but heat cannot enter from outside to room?

True

C. Short question

Q1. Define these terms and write their SI units?

Thermal energy,

The total energy and potential energy of all the particles is a substance is called thermal energy. Generally, in the SI system, all forms of energy are measured in terms of joules.

Temperature

Temperature of a body is measure of average kinetic energy of its particles. The Kelvin is the SI unit of temperature.

Heat.

Heat is a form of thermal energy that flows from hotter body to colder body. Heat is a form of energy therefore its unit is also joules.

Q2. Temperature of hot iron rod is 1000° C. Convert this temperature into kelvin and degree Fahrenheit?

Ans. **Conversion of Kelvin scale:**

$$T(k) = T^{\circ}C + 273$$

$$= 1000^{\circ} + 273$$

$$= 1273 \text{ k}$$

Conversion to Fahrenheit:

$$T^{\circ}F = 1.8T(^{\circ}C) + 32$$

$$= 1.8(1000) + 32$$

$$= 1800 + 32$$

$$= 1832^{\circ}F$$

Q3. Why base of cooking utensils is made up of steel but handles are made up of plastic?

Ans. Base of cooking utensil is made up of steel because steel is a metal and metals conduct heat fast and cook the food easily but handles are made up of plastic because plastic is insulator and bad conductor of heat, it prevents the heat from the pan to transfer to our hand.

Q4. If you put a dented ping pong ball in hot water, its dented part gets the proper shape. How does it happen?

Ans. If you put a dented ping pong in the water, its dented part gets the proper shape because the water will heat up air inside the ping pong ball. This causes the air to expand, popping the ball back into shape.

Q5. How can gliders fly very high without any engines? Give reason.

Ans. Gliders can fly very high without any engine by holding the currents of air. This air current works as a medium for their glide to fly high.

Q6. Why most materials become less dense as their temperature is increased?

Ans. Materials become less dense as their temperature is increased because when a substance is heated the molecules move faster causing the molecules to push outward making them further apart from each other.

Q7. Why exhaust fans are connected near the room ceiling?

Ans. Exhaust fans are connected near the room ceiling because warmer state air goes up and gets collected near the ceiling. Exhaust fan sucks that air out of the rooms and allows fresh air to enter the room through door, windows etc, thus improving room ventilation.

Q8. Briefly explain the expansion joints use in the bridges.

Ans. Bridge expansion joints allow the concrete to naturally expand and contract without cracking. The rubber expansion joints are placed at the end of a bridge where it meets up with the freeway. These connectors give the concrete just enough space to move and avoid concrete cracks.

Q9. How false ceiling helps to keep room at lower temperature than outside during the summer?

Ans. False ceiling helps to keep room at lower temperature than outside during the summer because the air filled gap between two layers of ceilings cools the room down, since air is a bad conductor of heat, it wouldn't allow the heat to flow in the room and helps to reduce the temperature during summer.

D. Long questions:

Q1. Differentiate between heat and temperature on the basis of Kinetic molecular theory.

Heat	Temperature
- Heat is the amount of energy in a body.	- Temperature is the measure of heat energy in a body.
- Total kinetic and potential energy contained by molecules in an object	- average kinetic energy of molecules in a substance
- Heat flows from hotter object to cooler objects	- Temperature rises when heated and falls when cooled

Q2. Solids are good conductors but gases are not. Explain in detail on the basis of kinetic molecular theory.

Ans. Solids are good conductors because when solid substance is heated, its particles are gaining kinetic energy and heat can easily be transferred from one particle to another.

Gases are poor conductor of heat, because their molecules are far apart and always in constant motion. It is very difficult for heat to pass from one point to another inside a closed container.

Q3. What is conduction? How heat is transferred by conduction? Why metals are good conductor of heat?

Ans. Conduction:

Conduction is the method of transfer of heat from hot body to cold body by the vibration of particles.

Process of heat transfer:

Conduction also takes place from hot part to its cold part, in solids its particles are very close to each other. When one of metal rod is heated then particles at that end begins to vibrate more energetically. They collide with neighboring particles and transfer a part of heat energy to them. In this way, energy transfer to its other end.

Metals are good Conductor:

Metals are good conductor of heat because in metals, they have free electrons. These free electrons move fast and transfer the energy to other part of the metal quickly.

Q4. What is convection? How heat is transferred by convection?

Ans. Convection:

Transfer of heat by actual movement of molecules from hot place to cold place is known as convection.

Process of heat transfer:

Convection can take place in fluids (liquids and gases) only. When cold water is heated in the pot then water touching the bottom of the pot first receives heat. It expands and becomes less dense. The cold water (denser) flows downward and hot water (lighter) rises up. This process continues and circulating flow of water is established (called conventional current). This will warm the whole water in the pot and this is method from transfer of heat due to actual movement of particles from bottom to top.

E. Structured questions:

Q1. You are asked to design a temperature scale. Let's call it "atto" temperature scale with unit symbol "A". If melting point of ice on it is 25° A and boiling point of water is 125° A.

a. Draw and label the diagram with values on lower and upper reference point.

Boiling point = 125° A

Freezing point = 25° A

b. Find the number of divisions on it. Also draw on the scale.

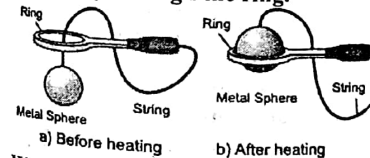
25 A = 273.15 K

So 1 A = 10.926 k

c. Which one is greater, 1° A or 1K?

Ans. It is clear that 1 A is greater than 1 k.

2. Consider the apparatus shown in the figure, the metal ball can pass easily through the ring.

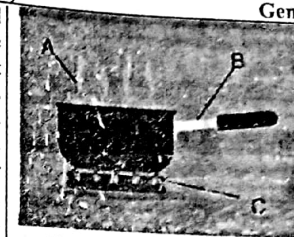


When metal ball is heated and we try to pass it through the ring again, it will not pass. Why?

When metal ball is heated, it will not again pass from the ring because of expansion. When metal ball is heated, molecules vibrate, expand and cause large size of substance.

3. Water is boiling in a pot as shown in the figure.

a. Identify which letter A/B/C is representing each of following processes: Conduction, Convection and Radiation.



Water is boiling in the pot

A. Convection B. Conduction C. Radiation

b. Explain how heat is transferred from stove to the base of pot?

Heat is transfer from stove to the base of pot by conduction process.

c. Explain how heat is transferred from water to air?

Heat is transferred from water to air through convection.

d. Pot handle is made up of plastic, will it get hot? If yes, justify your answer?

Pot handle is made up of plastic and it will not hot because it is insulator, and can't conduct heat.

4. A building is shown in the figure. You want to thermally insulate it.

a. How would you insulate its rooftop?

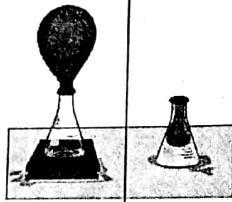
Rooftop of building can be insulated by using polythene or charcoal as a protective sheets.

b. What steps would you take to insulate it from inside?

Ans. Fiber glass, cellulose insulation for form insulation can be used to insulate building from inside.



5. A balloon is fixed on the mouth of a glass bottle which has a little amount of water. when this glass bottle is placed on hot plate balloon is inflated. Explain why?



Ans. A Balloon is fixed on the mouth of a glass bottle which has a little amount of water when this glass bottle is placed on hot plate balloon. Because balloon is made of rubber get interacted with steam, its molecule expand and causes balloon to inflated.

STOP AND CHECK

Two electric wires (blue wire and red wire) are tied to poles as shown. Which wire may break during winters?

Ans. Two electric wires (blue wire and red wire) tied to poles. Blue wire breaks during winter because in winter it will contract and will break.

Additional questions

Q1. Name four temperature scales?

Ans. The three temperature scales are:

- Kelvin scale
- Celsius scale
- Fahrenheit scale

Q2. Define thermal expansion?

Ans. When a substance is heated, its length, area, volume, shape or density change, this is called its thermal expansion.

Q3. Name few methods of heat transfer?

Ans. Heat can be transfer through following methods.

- Conduction
- Convection
- Radiation

Q4. What is the effect of heat on liquid in thermometer?

Ans. All substances expand on heating and contract on cooling (with some exceptions). This property of matter is used in different ways in our daily life. Let's explore some of its examples **Liquid in Thermometer:**

When a person with high fever puts thermometer in his/her mouth, metallic thermometer bulb and mercury will get heat. Mercury rises in the capillary tube and stops after reaching thermal equilibrium with body of the person. Then, we take reading of the

temperature from the Fahrenheit scale of the thermometer.

Q5. How thermals help to fly birds without fluttering their wings?

Ans. During a hot day, air near earth surface becomes hot. Its molecules gain greater kinetic energy, so it expands and becomes lighter. This hot air rises straight up. This upward moving air due to convection is called thermal. A thermal helps birds to fly for long time without fluttering their wings. Eagles, hawks and vultures are called best thermal climbers.

UNIT 11 TECHNOLOGY IN EVERYDAY LIFE

A. MCQs (Choose the correct option) 1. The percentage of fresh water on earth is not more than only

- a. 2% ✓
- b. 30%
- c. 20%
- d. 25%

2. Drip irrigation system is useful for agriculture because it allows water to

- a. Spread equally
- b. Reach the roots directly ✓
- c. Sprinkles water
- d. Evaporates

3. Given below from the list is not a way to preserve food

- a. Freezing
- b. Pickling
- c. Curing
- d. Garnishing ✓

4. The best way to preserve vegetables is

- a. Salting
- b. Drying ✓
- c. Curing
- d. Pickling

5. The instrument used by doctors for listening to heart beats is called

- a. Stethoscope ✓
- b. Microscope
- c. Periscope
- d. Ophthalmoscope

6. Which of the following is used for making a working model of a stethoscope?

- a. Funnels, plastic tube, balloons and duct tape ✓
- b. Funnels and duct tape only
- c. Tubing and duct tape only
- d. Balloons and duct tape only

7. Use of hand sanitizer helps in

- a. Killing germs from the skin and keeping it safe ✓
- b. Removing germs
- c. Keeping skin safe
- d. Keeping skin moisturized

8. In Pickling food is soaked in

- a. Water
- b. Oil ✓

c. Solution of salt and acid

d. Solution of sugar and acid

9. The process of food preservation in which bacteria is allowed to grow against the harmful bacteria is called

- a. Fermentation ✓
- b. Dry salting
- c. Pickling
- d. Canning

10. Pasteurization means

a. Freezing at a certain temperature to keep food microbe free

b. Heating at a certain temperature to keep food microbe free ✓

c. Drying at a certain temperature to keep food microbe free

d. Heating to change the colour of the food.

B. Long questions

Q1 What is preservation of food? Describe any five ways in which food can be preserved?

Ans. **Preservation of Food:**

Preserving food means preventing it from spoilage which can be achieved by many methods.

Canning

The food is heated at a specified temperate for a certain time (pasteurising) and then vacuum sealed in special glass jars. Canning works for most foods including fruits, vegetables, meats and seafood.

Freezing

Fruits, vegetables, meats, seafood, nuts, grains, dairy and eggs can be frozen, however foods must be chilled to at least -18 Celsius.

Drying

Drying is the process of dehydrating (removing moisture) foods until there is not enough moisture to support growth of microorganism.

Fruits, vegetables, meats, seafood, grains, legumes and nuts can be dried.

Pickling

In Pickling the food is soaked in a solution containing salt and acid (vinegar or lemon juice) this can be done with a wide variety of foods.

Dry Salting

This is an old-fashioned method which was used in the early twentieth century as an alternative to canning.

Q2. Why is water conservation a challenge in Pakistan? Why is it important to conserve water? Suggest a few ways in which we can

conserve water at an individual, community and national level?

Ans. **Conservation of water:**

Water conservation means to carefully used water in order to avoid any wastage.

Water conservation challenges in Pakistan:

Water conservation is a challenge in Pakistan. Because increasing population is increasing the water demand which is not met efficiently as we have water shortage.

Importance to conserve water:

Water is essential to life. Drinking, bathing, cleaning, cooking, washing are few domestic purposes of water. Water is also used for agriculture and industrial purpose.

Ways to conserve water:

1. Avoid un-necessary use of water for domestic purpose.

2. Creating awareness among people about need the ways to conserve water.

3. Important legislation regarding water usage and consumption by the government.

Q3. Write the steps to make a stethoscope in the school?

Cover the top of funnel with balloon

Wrap electrical tape around the balloon to hold it in place if needed

Stick the end of funnel into a piece of clear, flexible plastic tubing

Add, a small matching funnel to the other end

Use the stethoscope in a quite room

C. Structured questions

Q1. Imagine you and your friends are going camping for one week at a destination where electricity and shops are not available. Your stay can extend for 15 days to a month. Make a table to list:

a. The food items you will need keeping in mind the nutritional requirements.

Ans. Fruits, water, Juice, Dairy items, Dry fruits, emergency lights, candles, match boxes, necessary medicine, protein food milk etc.

b. Method of preservation used.

Ans. Dry things used milk and other food items are preserved by ice packs.

c. Also mention the days it will be safe for consumption.

Ans. Dry fruits, juices and water should be safely used for 15 days. Fruits and dairy items can easily be used for week or more.

2. Using the same technique you applied for making a stethoscope, make string telephone.

a. What is common in both projects?

Ans. Both require transmitter and vibration to produce sound.

b. Using the same technique what else can you make?

Ans. Same technique like stethoscope and telephone is microphone.

3. You made a hand sanitizer

a. What is the difference in hand wash with soap and using a hand sanitizer?

Ans. There are important differences between washing hands with soap and water and using hand sanitizer soap and water work to remove all types of germs from hands, while sanitizer acts by killing certain germs on the skin.

b. Make a poster to promote self-hygiene and cleanliness?



Additional Question

Q1. What is the importance of drip Irrigation?

Ans. Drip Irrigation can reduce water use 30 to 70 percent as compared to conventional sprinkles.

Q2. What is fermenting of food?

Ans. Fermenting

Many foods can be fermented, which means that good bacteria are encouraged to grow against the bad bacteria in order to preserve the food. Examples of fermented products are sauerkraut (from cabbage), cured sausage, and yogurt (from milk).

Q3. What do you know about pasteurization?

Ans. Louis Pasteur, French chemist and microbiologist, was the first to find out that heating at a certain temperature makes the food microbe free. The technique of pasteurization was named after him.

Q4. How to make hand sanitizer?

Ans.

1. $\frac{3}{4}$ cup of rubbing alcohol
2. $\frac{1}{2}$ cup of aloe vera gel
3. 5 -10 drops of essential oil (optional)

Directions:

- Mix Ethanol with aloe vera in a bowl and mix it thoroughly
- Blend in a few drops of essential oil
- After mixing them all pour them in a bottle for use

UNIT 12 EARTH AND SPACE

A. MCQs (Choose the correct option)

1. SI unit of weight is:

- a. Newton ✓
- b. Kilogram
- c. Meter per second
- d. Pascal

2. If 20 kg mass is lifted from earth to moon, what is its mass on moon?

- a. 20 kg ✓
- b. 2 kg
- c. 4 kg
- d. 3.2 kg

3. If value of g on a planet is 25 N/kg then what is weight of 2 kg body on it?

- a. 25 N
- b. 50 N ✓
- c. 75 N
- d. 150 N

4. If it is spring in southern hemisphere of earth then which weather is in northern hemisphere?

- a. Summer
- b. Winter
- c. Spring
- d. Autumn ✓

5. Which of following is involved in producing tides in ocean?

- a. Gravitational pull of moon on earth ✓
- b. Gravitational pull of sun
- c. Rotation of earth
- d. All of these

B. Write true or false. (Correct the statement if it is false)

1. Weight is quantity of matter in a body.

False:

Mass is quantity of matter in a body.

2. Seasons on earth are related to spinning motion of earth.

True:

3. Spring balance is a device to measure weight of a body.

True:

4. Axial tilt of earth is about 23.5°.

True:

5. When it is summer in northern hemisphere then it is spring in southern hemisphere.

False:

When it is summer northern hemisphere then it is winter in southern hemisphere.

C. Short questions

Q1. Differentiate between mass and weight of body

Mass	Weight
- Quantity of matter in a body is called its mass	- The force with which earth attracts anything towards its center is called weight.
- its SI unit is kg	- its unit is N

Q2. What is difference in value of gravitational field strength on earth and on moon?

Ans. Gravitational field strength on earth:

On surface of earth value of g is 9.8 Newton per kilo gram (nearly 10 N/kg)

Gravitational field strength on moon:

Gravitational field strength on surface of moon is also 6 times less than that of earth.

$$g_{\text{moon}} = \frac{1}{6} (g_{\text{earth}})$$

$$g_{\text{moon}} = \frac{1}{6} (10) = 1.6 \text{ N/kg}$$

Q3. If mass of the body is 50 kg, then calculate its weight on earth and on moon?

Given mass = m = 50 kg

$$g_{\text{earth}} = 10 \text{ N/kg}$$

$$g_{\text{moon}} = 1.6 \text{ N/kg}$$

Weight on earth:

$$W_{\text{earth}} = mg$$

$$W_{\text{earth}} = 50 \times 10 \text{ N/kg}$$

$$W_{\text{earth}} = 500 \text{ N}$$

Weight on Moon:

$$W_{\text{moon}} = m \times g_{\text{moon}}$$

$$W_{\text{moon}} = 50 \text{ kg} \times 1.6 \frac{\text{N}}{\text{kg}}$$

$$W_{\text{moon}} = 80 \text{ N}$$

Q4. Define the following terms;

(i) Axis of earth.

Axis of earth is imaginary line on which earth rotates.

Hemisphere

Hemi means half and sphere means one half of earth as northern hemisphere and southern hemisphere.

Equator

The equator is an imaginary line around the middle of a planet or other celestial body.

Q5. What is constellation? Why does a constellation position change during a year?

Constellation:

A constellation is a group of stars that appears to form a pattern or picture.

Constellation position change during a year:

Due to axial tilt of the earth, angle of view to each constellation changes with the motion of earth, that's why they appear at different position in different months of the year.

Q6. Briefly explain, how axial tilt is used in season change on earth?

Earth's tilted axis causes the change:

Throughout the year, different parts of Earth receive the sun's most direct rays. So, when the North pole tilts toward sun, it summer in Northern Hemisphere. And when the south pole tilts towards the sun, its winter in the Northern Hemisphere

Q7. "If there was no axial tilt then there would have been no change in seasons on earth". Support or oppose this statement with reason.

Ans. Yes, if there is no axial tilt then there would have been no change in season on earth because earth revolves around the sun with this axis tilt. Earth's tilted cause the seasons. When earth is nearer to sun it is summer, when it is away then winter and in between both spring and autumn season.

Q8. How does Sun hold planets in their orbits?

Ans. The sun's gravity pulls the planets in orbit around it.

Q9. If the gravity between earth and moon suddenly disappears, what will happen to moon which is revolving around earth?

Ans. If the gravity between earth and moon suddenly disappear, everything will collapse and fly like feather. E.g. moon will continuously revolving at same speed and will collapse.

D. Long questions:

Q1. How does gravity help to keep the planets in their orbits around sun?

Ans. The planets all formed from this spinning disk-shaped cloud, and continued this rotating course around the sun after they were formed. The gravity of the sun keeps the planets in their orbits. They stay in their orbits because there is no other force in the solar system which can stop them.

Q 2. Differentiate between mass and weight of a body.

Mass	Weight
- The mass of a body is the amount of matter present in it	- The weight of a body is the force with which the earth attracts it.
- It has magnitude but not direction	- It has both magnitude and direction.
- It doesn't change from place to place	- It changes from place to place
- it can never be zero	- It is zero at the center of the earth
- Its SI Unit is the kilogram	- Its SI Unit is the Newton.

Q3. What is the axial tilt of the Earth? Describe its role in the earth's day and night. What role does it play in the earth's seasonal change?

Ans. **Axial tilt:**

The axial tilt is defined as the angle between the direction of the north pole and the perpendicular to the orbital plane.

Role of axis tilt in day and night:

As the earth spins on its axis producing day and night, It also moves above the sun in an elliptical orbit that requires about 365 days to complete.

Reasons of axis tilt in season:

Earth's tilted axis causes the season. Throughout the year, different parts of earth receives the sun's most direct rays, so when the North pole tilts towards the sun, its summer in the Northern hemisphere and when the South pole tilt towards the sun, its winter in the Northern hemisphere.

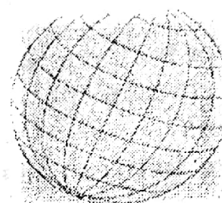
Q4. Describe how seasons in earth's hemispheres are related to Earth's annual movement around the sun?

Ans: Seasons in Earth hemisphere are related to earth annual movement around the sun by the help of axis tilt. The earth's spin axis is tilted with respect to its orbital plane. When the

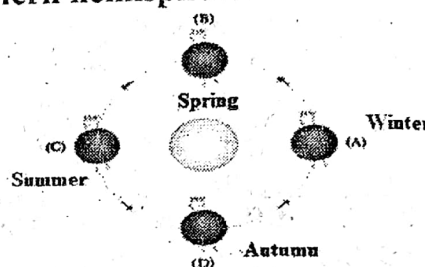
earth's axis pointed towards the sun, it is summer for that hemisphere while if Earth's axis pointed away from the sun, it is expected to be winter in that hemisphere

E. Structured questions:

1. Draw equator, axial tilt, spinning axis of earth, longitude and latitude, southern and northern hemisphere.



2. Label the diagram with different seasons in southern hemisphere?



Additional Questions

Q1. Will the mass of the body change if it is shifted from earth to moon?

Ans. No, because changing the location of the body there will be no change in amount of matter in it.

Q2. What is force meter?

Ans. The device with which weight of a body is measured is called spring balance or force meter.

Where

W = weight of the body

m = mass of the body

g = gravitational field strength

Q3. Define tides

Ans. Tides are the rise and fall of water level in the oceans, river and water takes etc.

Q4. Define inertia. Discuss with examples

Ans. **Inertia:**

Every object wants to maintain in one of two states: rest or uniform motion. This property of object is called Inertia.

Q5. Discuss a centripetal force?

Ans. **Centripetal Force:** There is a force which moves the body into a circle. It is called centripetal force. It is the same force which moves a stone tied to string in a circle when it is whirled. Stone wants to go straight but this force moves it in circle.