

UNIT: 1.  
PLANT SYSTEM

Words	Meanings	Words	Meanings
System	نظام	Process	مراحل
Plant	پودے	Evaporates	بخارات
Root	جڑ	Force	قوت
Shoot	شاخ	Intensity	شدت
Root Hair	جڑ ہال	Temperature	درجہ حرارت
Mineral	معدنیات	Humidity	نمی
Absorb	جذب	Transpirat	تبخیر
Diffusion	نفوذ	Photosynthesis	ضیائی تالیف
Cortex	چھلکا	Green	سبز
Taproot	اصل جڑ	Chlorophyll	سبزینہ
Flower	پھول	Respiration	سانس
Transport	ترسیل	Wax	موم
Strong	مضبوط	Cuticle	چھلکا
Shrub	جھاڑی	Mineral	معدنیات
Beneath	نیچے	Energy	توانائی
Fact	حقیقت	Continuous	مسل
Midrib	درمیانی رگ	-----	-----

EXERCISE:

Q.1 Choose the correct options.

- The root system which can get water from deep underground sources are.
  - Fibrous root.
  - Tap root.
  - Storage root.
  - Root nodules
- Which of the following is not an organ of a plant?
  - Epidermis
  - Root
  - Stem
  - Leaf
- Vascular bundles are present in every part of the plant. They are made up of;
  - Xylem
  - Phloem
  - Xylem & phloem
  - Xylem, Phloem & Root Hair cells
- Amna liked to grow plants on her terrace, the plants were getting light and water every day but they were not growing properly. What suggestion can you give her to improve plant growth?



- a) Add sugar to the plant pot.
  - b) Give water once a week.
  - c) Add composite fertilizer to plant pots.
  - d) Shift them indoors.
5. If water available to the plant becomes less. Then stomata are closed even in the daytime. This protects plants from;
- a) Photosynthesis.
  - b) Respiration.
  - c) Wilting.
  - d) Transport of water.
6. The protective layer around plants is
- a) Epidermis.
  - b) Cortex.
  - c) Mesophyll.
  - d) Vascular bundle.
7. If the concentration of carbon dioxide increases the air during day time the process of
- a) photosynthesis will decrease
  - b) respiration will decrease
  - c) Photosynthesis will increase
  - d) Respiration will increase
8. Plant perform respiration all the day, the purpose of respiration in plants is to
- a) prepare food
  - b) release energy
  - c) absorbed energy
  - d) maintain healthy growth
9. If you stay under 30 at night you can feel dizziness due to
- a) high level of Oxygen and low level of carbon dioxide
  - b) low level of Oxygen and high level of carbon dioxide
  - c) Poisonous gas released by trees
  - d) ghosts living in the tree
10. Which of the following is correct equation for respiration.
- a) Carbon dioxide + water  $\rightarrow$  glucose + oxygen.
  - b) Carbondioxide + water + sunlight  $\rightarrow$  glucose + oxygen
  - c) Glucose + oxygen  $\rightarrow$  carbon dioxide + water
  - d) Glucose + oxygen  $\rightarrow$  carbon dioxide + water + energy

**Question: B**

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

1. Exchange of gasses in plants takes place through tiny holes called stomata located on the margin of leaves. **False.**  
Exchange of gasses in plants takes place through tiny holes called stomata located on the underside of leaves.
2. 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 a minimum amount of chlorophyll in them

3. Respiration only takes place in animal cells because they need energy. **False.**  
Respiration takes place in all living things because they need energy.
4. The job of root hairs is to protect the root from damage. **False.**  
The job of root hairs is to take water and nutrition from the soil.
5. Xylem is dead tissue while phloem is living tissue. **True.**

### Short questions

**Q.1 What are the three functions of roots?**

**Answer:**

The three functions of roots are:

- a) Support the plants
- b) Absorb water
- c) Absorb minerals

**Q.2 How stomata help in the process of photosynthesis?**

**Answer:**

Exchange of gasses in plants take place through stomata. For example: carbon dioxide enters the leaf through stomata while oxygen moves out through stomata.

**Q.3 Why respiration take place in plants?**

**Answer:**

All the plants need energy and respiration is the breakdown of food to get energy. Therefore respiration takes place in all plants.

**Q.4 How is photosynthesis important for:**

- a) Plants?
- b) Humans and other animals
- c) Atmosphere

**Answer:**

- a) Plants prepare their food through a process known as photosynthesis
- b) As oxygen is produced in the process of photosynthesis which is essential for breathing of all living things.
- c) Photosynthesis helps to maintain a balance between Oxygen and Carbon dioxide in atmosphere.

### LONG QUESTIONS

**Q.1 Compare the properties of xylem and phloem.**

**Answer:**

The transport system of the plant consists of a network of tubes called xylem and phloem.

**Xylem:**

Transport water and minerals from the roots to the leaves through the stem.

Xylem is dead tissue. Xylem forms wood.



**Phloem:**

The phloem transports food in the form of sugar solution from leaves to all other parts of the plant.

**Q:2** Photosynthesis and respiration are two different processes differentiate between them.

**Answer:**

**Photosynthesis:**

That process through which plants use light energy from the sun, carbon dioxide from air and water from soil to make glucose and oxygen

Carbon Dioxide + water sunlight & chlorophyll Glucose + oxygen.

**Respiration:**

Respiration is the breakdown of food to get energy.

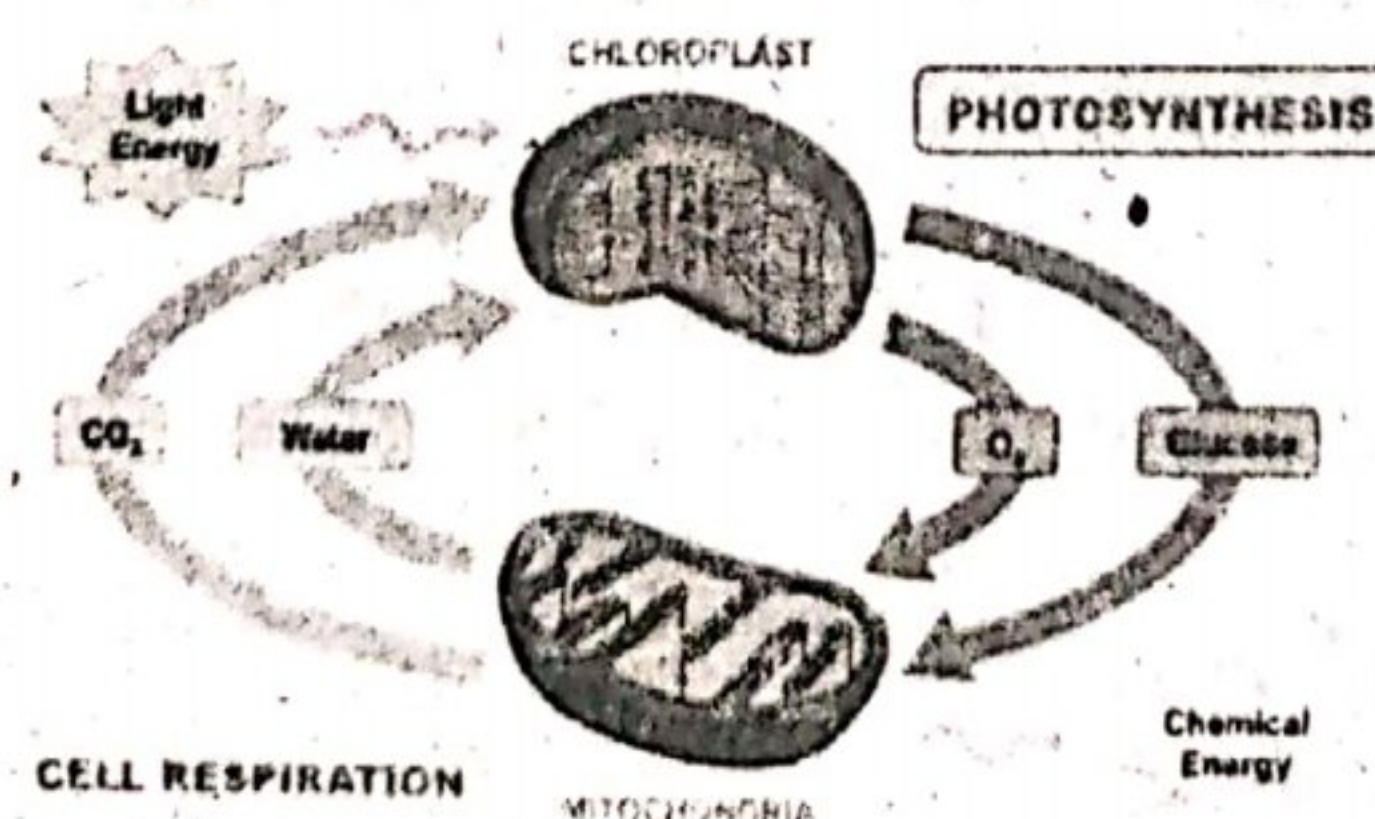
Glucose + oxygen carbon dioxide + water + energy

**Comparison between photosynthesis and respiration:**

	Respiration	Photosynthesis
Occurs in	All living things	only green parts of plants
When it occurs	all the time	only in Daylight
Organelle involved	mitochondria	chloroplast
reactants	glucose and oxygen	carbon dioxide and water
products	carbon dioxide in water	glucose and oxygen
Energy link	energy is released	energy is absorbed

**E. Structured Questions.**

**Q.1** The following diagram shows the two processes taking place in the plant cell photosynthesis and cellular respiration.



**A.** Which process takes place only in green parts of plants?



Photosynthesis.

B. Which process takes place in all living cells all the time?  
Respiration.

C. Which process only take place during the daytime?  
Photosynthesis.

D. Which process helps carbon dioxide level in the air?  
Photosynthesis can help to balance carbon dioxide in air.

E. Which structure acts as a solar panel?  
Chloroplast act as a solar panel.

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

Conditions	transpiration rate (mm/min )
Darkness	1
Bright light	17
Moving air	21
Still air	9
Dry air	11
Moist air	5
Warm air	16
Cold air	6
Dry soil	2
Moist soil	18

A. Which conditions used is the fastest rate of transpiration?

Ans: Plants transpire more rapidly at higher temperatures and fastest blowing winds.

B. Which sort of conditions can increase the rate of transpiration?

Ans: Conditions that can increase the rate of transpiration are wind speed, light intensity and temperature.

C. What sort of condition can decrease the rate of transpiration?

Ans: conditions that can decrease the rate of transpiration are increase in humidity and cooler air.

D. How does transpiration help in the water cycle?



Ans: Plants draw water and nutrients from the soil through the roots. Some of this water is returned to the air by transpiration.

## UNIT: 2

## HUMAN RESPIRATORY AND CIRCULATORY SYSTEM

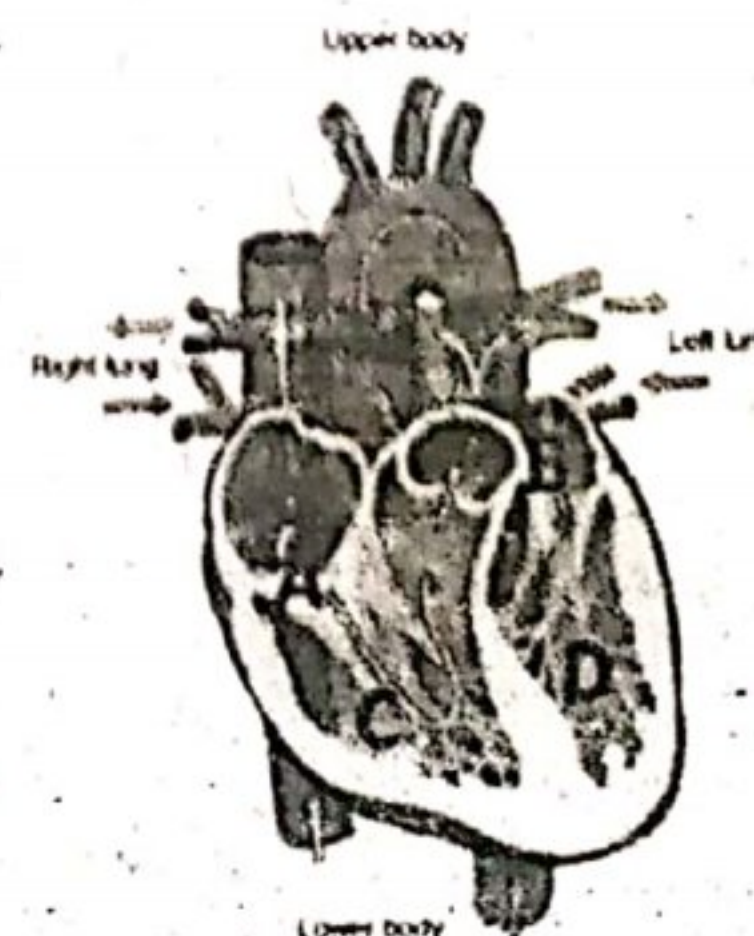
words	meanings	words	meanings
Respiratory system	عمل تنفس	vein	رک
circulatory system	نظام دوران خون	transport	ترسیل
survival	بقا	nutrient	غذا
aerobic	زندہ رہنے کیلئے	waste	فائل مادے
available	مہیا	hormones	رطوبت
exchange	تبادلہ	red blood cells	خون کے سرخ خلیے
moist	نمی	Structure	ساخت
windpipe (trachea)	ہوا کی نالی	function	فعل
larynx	نرخرہ	Harmful	مضر
lungs	پھیپھڑیں	germ	جراثیم
inhalation	سانس کھینچنا	deficiency	کمی
exhalation	سانس چھوڑنا	muscles	عضلات
enzymes	خامرے	Atrium	داخل ہونے کا راستہ
aorta	شاہ رگ	Artery	شریان

## MCQs Choose the correct option.

1. A team of climbers was climbing a high mountain. When they reached the top they felt difficulty in breathing because at higher altitude there is
  - a) more oxygen
  - b) less oxygen
  - b) more carbon dioxide
  - c) low temperatures



2. The exchange of substances between blood and body cells can take place at the
- a) capillaries      b) veins      c) arteries      d) Heart
3. A person affected with anemia 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 gases between blood and air take place at
- a) trachea  
b) bronchi  
c) bronchioles  
d) Alveoli
5. Cellular respiration always require
- a) glucose and oxygen  
b) glucose  
c) glucose, Oxygen and Carbon dioxide  
d) alcohol, lactic acid and carbon dioxide
6. Valves are flats that keep blood flowing in One Direction valves are found in:
- a) artery and veins  
b) artery veins and capillary  
c) vein and heart  
d) artery vein capillary and heart
7. Oxygenated blood is found in two chamber of heart including.
- a) right and left Atrium      b) right and left ventricle  
c) right Atrium and left ventricle  
d) left Atrium and left ventricle
8. Which component of blood is liquid?
- a) Plasma      b) red blood cells  
c) white blood cells      d) Platelets
9. The diagram showing different types of blood cells which cell is filled with hemoglobin?
- a) White blood cells      b) Red blood cells  
c) Platelets      d) Plasma.
10. The diagram shown blood flow through a human heart which chamber pumps the blood to lungs
- a. A      b. B      c. C      d. D





### Question 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 process while respiration is a chemical change.

2. Blood clotting requires platelets in blood. True.

3. Anaerobic respiration releases large amount of energy.

Aerobic respiration releases large amount of energy.

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

Thin walls of alveoli helps in the exchange of gases.

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

Arteries carry blood rich with oxygen and food.

### SHORT QUESTIONS

Q: Can a cell survive without energy?

Answer:

No, cell cannot survive without energy because energy is essential for the survival of every living cell.

Q2: Arrange these words in such a way to show how oxygen from air reaches into your blood, Nasal cavity, bronchioles, blood capillaries, air, alveoli, bronchi, nostrils and trachea?

Answer:

Oxygen from air reaches our blood through air, nostrils, nasal cavity, trachea, bronchi, bronchioles, alveoli and at last to blood capillaries.

Q:3 Which substances are transported by blood?

Answer:

Blood transport water, nutrients, gasses, waste and Chemicals (hormones, ions etc) from one part of the body to another.

Q:4 Differentiate between

a. Artery and vein.

b. Atrium and ventricle.

Answer:

Artery: a: Arteries are blood vessels that carry blood away from the heart to other parts of the body. They have thick walls.

Veins: Veins are the blood vessels that carry blood back to the heart from the cell. They have thin walls.

b. Atrium and ventricles: The heart is divided into two sides each side of the heart has two parts. The upper blood receiving part of each side is called Atrium. The lower distributing part is called ventricle. Ventricles are larger, thicker walled and more powerful than Atrium.

Q:5 How does the blood circulate around the body?

Answer:

The system that moves blood throughout the body is called the circulatory system. It includes the blood, blood vessels and heart. The blood circulates in our body through a network of vessels and transport gasses, nutrients, waste and energy.

Q:6 Compare respiration and breathing.

Ans: Difference between Breathing and Respiration:

Breathing	respiration
1) It is 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.
2) Energy is not released.	Energy is released.
3) It takes place outside the cells.	It takes place within the cell.
4) Enzymes are not involved.	Respiratory enzymes are involved.

### LONG QUESTIONS

**Q: 1 Differentiate between aerobic and anaerobic respiration.**

**Answer:**

Cellular respiration is of two types it can take place with or without oxygen.

**Aerobic respiration:**

If it takes place in the presence of oxygen it is called aerobic respiration. During aerobic respiration glucose reacts with oxygen in mitochondria of a cell to release a large amount of energy. Carbon dioxide and water are produced as the waste products.

**Anaerobic respiration:**

If oxygen is not available, then some cells temporally shift to anaerobic respiration. This releases a small amount of energy from food as compared to aerobic respiration. Waste product can be alcohol and carbon dioxide.

**Q:2 How do the respiratory and circulatory system work together to provide body cells with the materials they need?**

**Answer:**

Respiratory system works directly with the circulatory system and provides oxygen to the body.

Oxygen taken in from the respiratory system moves into blood vessels that then circulate.

Oxygen rich blood to tissues and cells.

Our blood also carries Oxygen inhaled by the lungs. Our circulatory system delivers Oxygen and nutrients to the other cell of our body then picks up any waste products created by the cells including carbon dioxide and delivers these waste products to the kidney and lungs for disposal.

### D: Structured Questions

**Q: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

**Q: Why oxygen percentage is reduced in the air that is breathed out?**

**Answer:** As oxygen is used in respiration. Therefore oxygen percentage is reduced in air that is breathed out.

**Q: b Amount of which gas is unchanged and why?**

**Ans:** As nitrogen is not used in respiration therefore nitrogen percentage is unchanged.

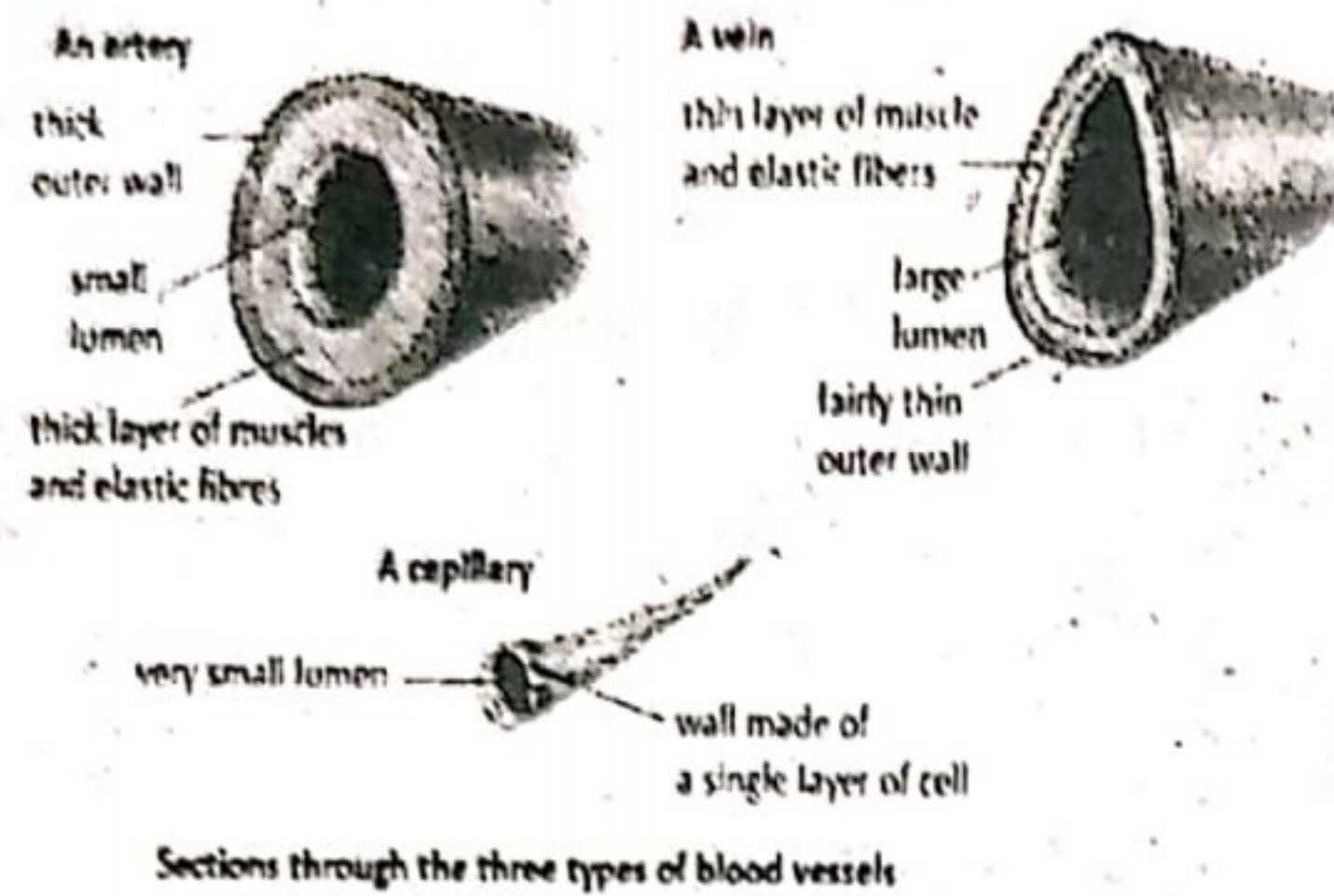
**Q: c Why carbon dioxide percentage is increased in the exhaled air?**

**Answer:** During respiration carbon dioxide is produced as a waste product.



So its percentage is increased in the exhaled air.

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



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

Ans: Capillaries are so tiny that we can only see them with a microscope.

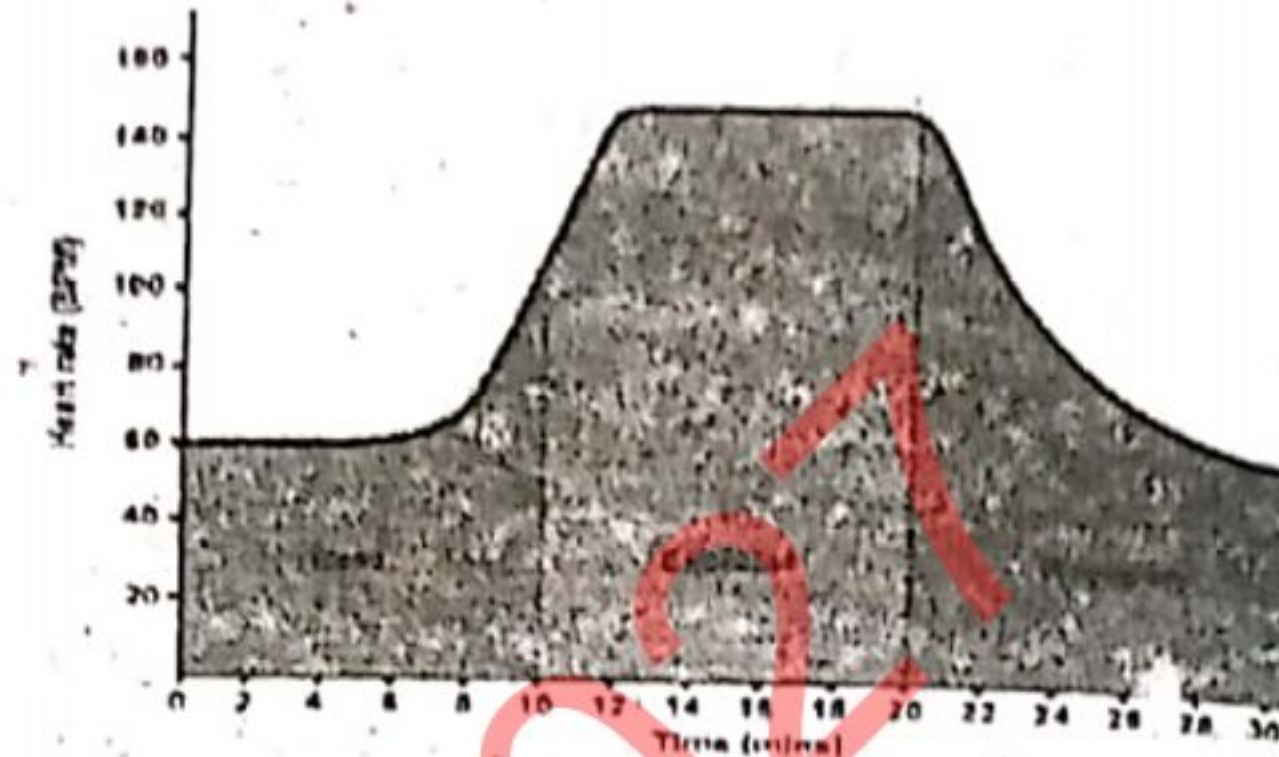
b. Which blood vessel will hold more blood than the other two?

Ans: Veins are thinner and less rigid. So veins can hold more blood.

c. Why pulse is produced only in arteries?

Ans: When the heart pushes blood into the aorta, the blood creates a pressure that continues along the arteries.

**Q.3** Anummeasures her pulse rate before she exercises. It is 60 beats per minute. She exercises for 20 minutes and measures her pulse status again. She then much is it every time for several minutes. She draws a graph to show her results.



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

Ans: During exercise, her heart beats faster so that more blood gets out to your body. So her pulse rate increases.

B. After how many time does her pulse rate return to normal?

Ans: After 40 minutes pulse rate return to normal.

C. What can be concluded from her results?

Ans: During exercise her pulse rate increases then stay constant, then decreases and finally returns to normal.

### UNIT: 3 IMMUNITY AND DISEASES

Words	Meanings	Words	Meanings
immunity	قوت مدافعت	fever	بخار
diseases	بیماریاں	cough	کھانسی
wounds	زخم	pain	درد
infectious diseases	وبائی امراض	fatigue	تکاوٹ



parasite	طفیلی	kidney	گردہ
typhoid	معیادی بخار	prevention	علاج
innate	پیدائشی (فطری)	social distancing	سماجی فاصلہ
adaptive	ڈھل جانے والا	crowd	ہجوم
passive	غیر متحرک	Vomiting	اٹنی آنا
defence	دفاع	weakness	کمزوری
fever	بخار	Severe	سخت
mucus	رطوبت	headache	سر درد
membrane	پردہ	Drain	نکاسی
antibodies	خون کے اندر بننے والا ایسا مواد جو جراثیم کو ختم کرنا	hepatitis	یرقان
harmful	نقصان دہ	hunger	بھوک
memory	یادداشت	needle	سوئی
healthy	تندرست	spread	پھیلاؤ
boost	افزائش کرنا	urine	پیشاب
regularly	باقاعدگی سے		

### A. MCQs choose the correct option.

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

- first line of Defence
- second line of Defence
- third line of Defence
- fourth line of Defence

2. A newborn baby has less immunity as compared to other people. The baby has only.

- initiate immunity
- adaptive immunity
- passive immunity
- initiate 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:

- a) Pathogens
- b) anti-bodies
- c) virus
- d) Bacteria

4. Third line of defence learn about enemy and adopts accordingly. It is also called

- a) Adaptive /learnt immunity.
- b) Innate immunity.
- c) Passive immunity.
- d) Natural passive immunity.

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

- a) Infectious disease
- b) Disease due to pathogen
- c) Viral attack
- d) Non infectious disease

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

- a) Innate immunity
- b) Adaptive immunity
- c) Passive immunity
- d) learned immunity

7. Maximum number of additional defence layer is required for :

- a) Medical staff
- b) Teachers
- c) Students
- d) Lawyers

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

- a) Control mosquitoes
- b) Control air pollution
- c) Improve hospitals
- d) Improve sanitation and hygiene conditions

9. Respiratory system related diseases mostly spread through

- a) Water.
- b) Food
- c) Blood

d) Droplets in air

10. Which of the following can provide you with long-term immunity against infectious diseases.

- a) Antibiotics
- b) Vitamins
- c) Vaccines
- d) Red blood cells

### B. SHORT QUESTION

Q: 1 Which line of Defence acts last in immune response? List its components.

Answer:

The third line of Defence acts last in immune response. It identifies the germ and start making special type of white blood cells i.e T-cells and B-cells.

Q: 2 Which line of Defence is not concerned with recognition of the pathogen Intruder?

Answer:

Innate immunity represents the first line of defence which is not concerned with recognition of the pathogen intruder.

Q: 3 Some harmful chemicals can make you sick but Chemicals are not included in the list of pathogens. Why?

Answer:

Pathogens are disease causing germs including virus, bacteria, fungi, and parasites.

While harmful chemicals do not contain the above germs. Therefore chemicals are not included in the list of pathogens.

Q: 4 Adaptive immune response increases with time. Why?

Answer:

The adaptive immune response take days or even weeks to become established, Therefore adaptive immune response increases with time.

Q: 5 People throughout the world have become focused on improving immune system from March 2020 why?

Answer:



People throughout the world have become focused on improving immune system from March 2020. Because so many infectious diseases spread all over the world.

### LONG QUESTIONS.

**Q:1** Explain different types of immunity.

**Answer:**

There are three types of immunity i.e:

- a. **Innate immunity:** It is the natural defence of the body against any intruder. It has two components.
  1. The first line of Defence stops entry of germs in the body. It includes skin and mucous membranes of mouth, nose etc.
  2. Second line of Defence includes; some white blood cells, Chemicals, and fever.

b) **Adaptive immunity:** It includes the third line of Defence. It identifies the job and starts making special type of white blood cells i.e T-cells and B-cells.

c) **Possessive immunity:** after Snake bite, a person's life is threatened already prepared antibodies are injected which stop the effect of snake venom. This type of immunity is short lived and it is called passive immunity.

**Q:2** Explain the mechanism of antibody formation.

**Answer:**

There are two ways to start enter body formation by your immune system. Either you get disease or you get vaccination.

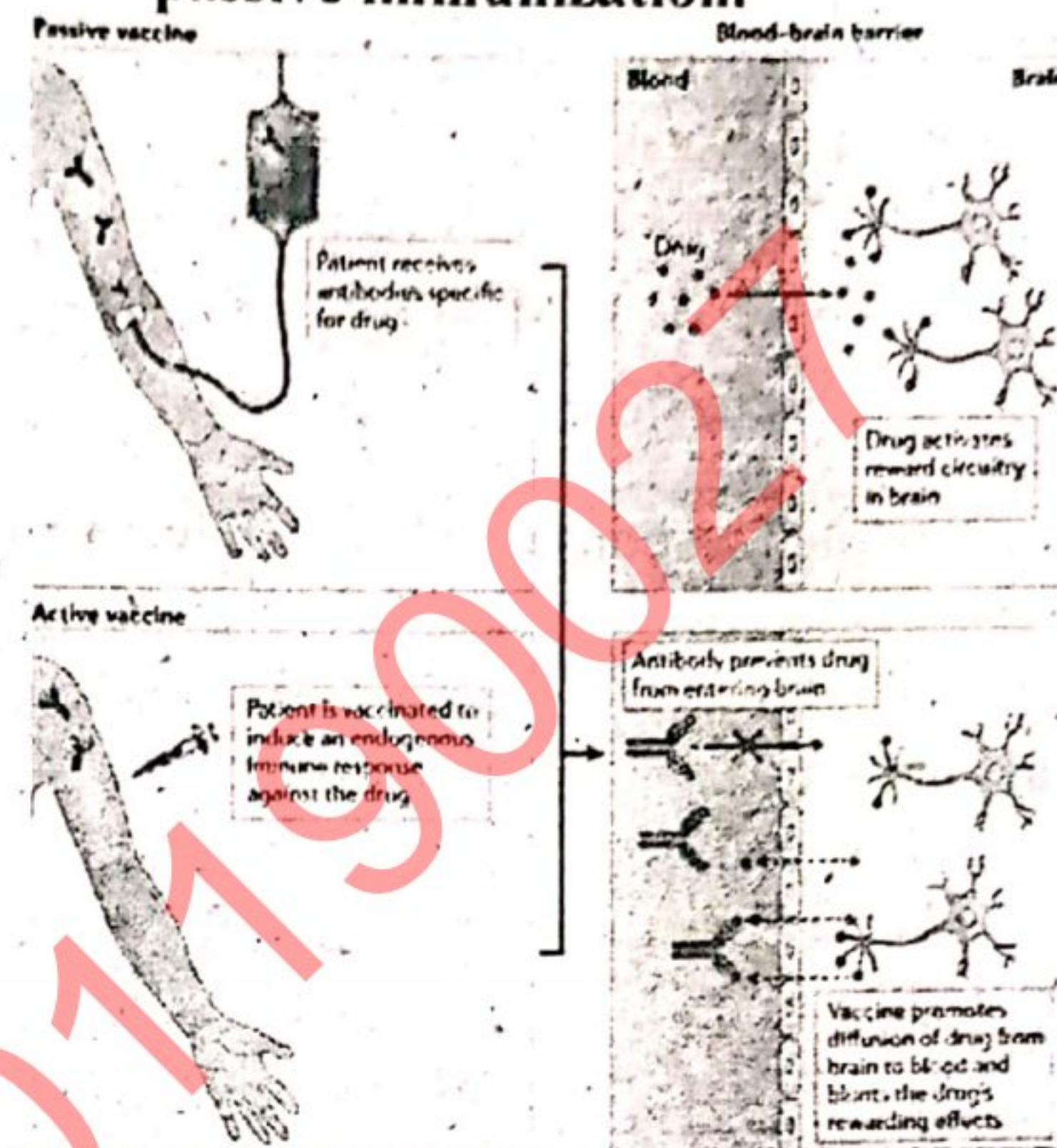
Our immune system requires exposure to pathogen to activate and start antibody formation.

A vaccine works by training the immune system to recognize and fight pathogen. Example polio vaccine for covid-19 vaccine.

B and T cells form memory cells as well. These memory cells remembers their enemies.

### STRUCTURED QUESTIONS:

1. Differentiate between active and passive immunization.



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

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

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

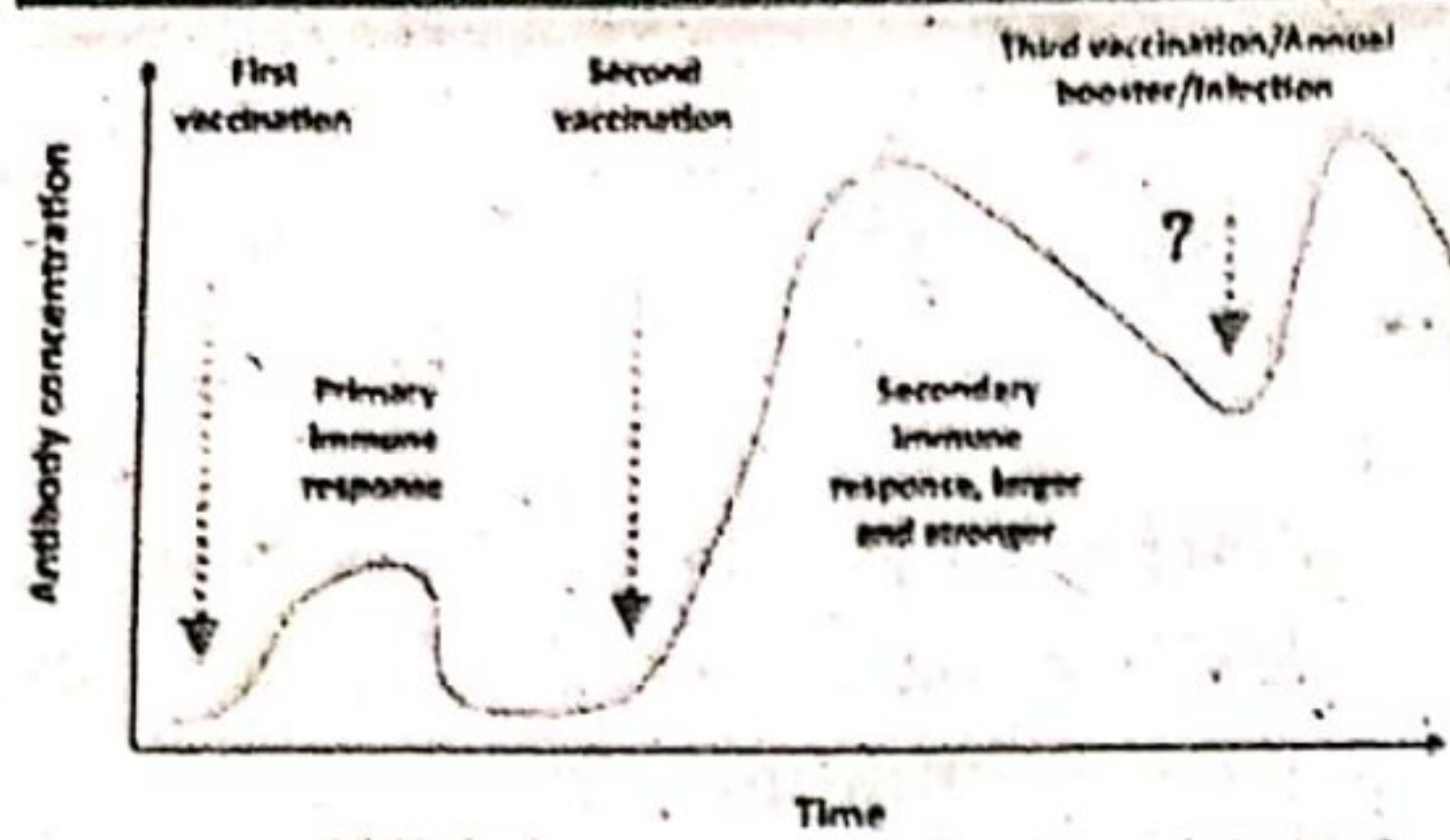
Ans: Passive immunity is produced by already prepared antibodies.

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

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

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





a. Which response is capable of controlling disease effectively?

Ans: Secondary response is capable of controlling disease effectively.

b. Which response is slow to develop antibodies?

Ans: First response is slow to develop antibodies.

c. What is the importance of a booster dose of vaccine?

Ans: The booster dose helps people maintain strong protection from severe disease.

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

Ans: If a pathogen enters in the body at day 90. Then the immune system recognize, fight pathogen and kill it.

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

Ans: If pathogen of this disease enters in the body at day 0. Then immune system could hardly fight pathogen.

#### UNIT 4 PHYSICAL AND CHEMICAL CHANGES

Words	Meaning	Words	Meaning
Physical change	طبیعی تبدیلی	Density	کثافت
Chemical change	کیمیائی تبدیلی	Galvanizing	جست کاری، تہہ چڑھانا
Universe	کائنات	Mass	کیت
Activities	سرگرمیاں	Volume	حجم
Observe	مشاہدہ	Weight	وزن
Matter	مادہ	Hardness	سخت پن
Melts	منجمد ہوتا	Boiling point	نقطہ جوش
Chopping	ٹکڑے کرنا	Melting point	نقطہ پگھلاؤ
Tearing	پھاڑنا	Characteristics	خصوصیات
Grinding	پینا	Thermal	حرارت
Boiling	جوش	Solubility	حل پذیری
Combustion	جلیے کا عمل	Metal	دھات
Yoghurt	دہی	Dangerous	خطرناک



Photosynthesis	ضائی تالیف	Toxic	زہریلے مادے
Rusting	زنگ لگنا	Protect	محفوظ کرنا
Rotting	خراب ہونا	Coating	تہہ چڑھانا
Fuels	اینڈھن	Suggestion	مشورہ
Environment	ماحول	Tarnishing	آلودہ کرنا/میلا کرنا

**EXERCISE:****A. MCQs (Choose the correct options)**

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

- a) Mixing baking soda and vinegar cause bubbles.
- b) chopping of log
- c) burning of paper with a lighter
- d) Baking a birthday cake of your mother.

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

- a) filling 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 one's 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 change is called a:

- a) Chemical change
- b) Physical change
- c) both physical and chemical changes

d) neither physical change 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 stay the same
- c) stay the same
- d) mass is lost

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

- 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

**Short questions.**

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

**Answer:**

in boiling of egg the composition of egg changes, therefore it is called chemical



change. While in boiling of water the composition of water remains the same therefore it is called physical change.

**Q2 What is a chemical property?**

**Answer:**

A chemical property is a characteristic of a substance that may be observed when it participates in a chemical change.

Chemical properties are flammability, rusting etc.

**Q3 Define the chemical property called rusting?**

**Answer:**

Rusting is defined as "the chemical process in which there is a formation of red orange coat on the surface of metals".

It is a part of corrosion.

**Q4 What is flammability? Identify example of flammability matter.**

**Answer:**

Flammability is the ability to catch fire easily. example of Flammable matter are wood, gasoline ether etc.

**Q5 Why silver gets tranished after sometime?**

**Answer:**

Silver object gets black coating over time when they are exposed to air.

This is due to hydrogen sulphide in air, reacts with silver to form black silver sulphide.

**LONG QUESTIONS****Q1 Distinguish between physical and chemical changes. State with at least 2 examples from daily life.**

**Answer;**

Physical changes are those changes in which no new substances are formed and be easily reversed.

While chemical changes are those changes in which new substances are formed that cannot be reversed, examples

of physical changes are cutting, tearing grinding mixing and chopping etc. Examples of chemical changes are rusting, burning rotting, photosynthesis etc.

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

**Answer:**

**Combustion:**

Chemical process where fuel coil/ wood reacts with oxygen to give heat and light energy.

Combustion means burning effect. Combustion is used in cars rocket engines and many other type of machinery.

Fuel + oxygen  $\rightarrow$  carbon dioxide + water + energy

**Harmful effects of combustion on the environment:**

In case of incomplete combustion poisonous gasses are produced that can kill people.

In case of complete combustion acid rain global warming and respiratory diseases are created.

**Q3 What is rusting? Suggest any three ways to prevent the rusting of iron?**

**Answer:**

**Rusting:**

Rusting is defined as the chemical process in which there is a formation of red or orange coat on the surface of metals"

It is a part of corrosion of metals only rust when they are exposed to air.

Rusting can be prevented by using the following methods:

- ❖ Paint the exposed part of the metals
- ❖ Galvanizing coating the metals
- ❖ Do not allow metals to be left in an open area, where water or humidity can easily reach.

**D. STRUCTURED QUESTIONS:**



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



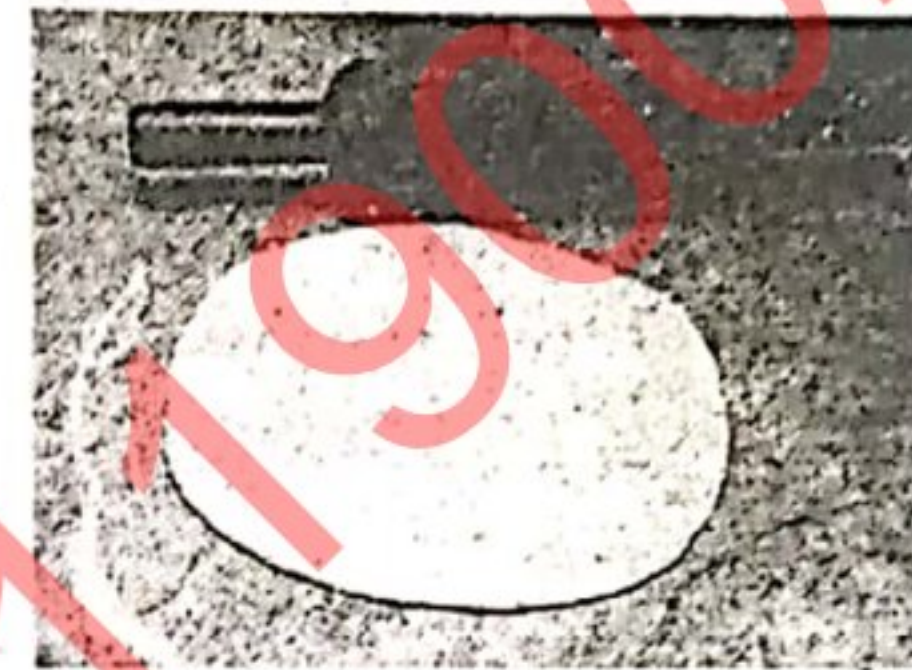
**Answer:**

As metals are good conductors while plastic are insulators:  
Therefore Pan is made of metal to conduct heat while handle are made of plastic which do not conduct heat.

a. Soaking is a chemical change where the flour and water mixes together and they cannot be separated again.



b. Making roti with a balan is a physical change which can be changed back to the soaked dough.



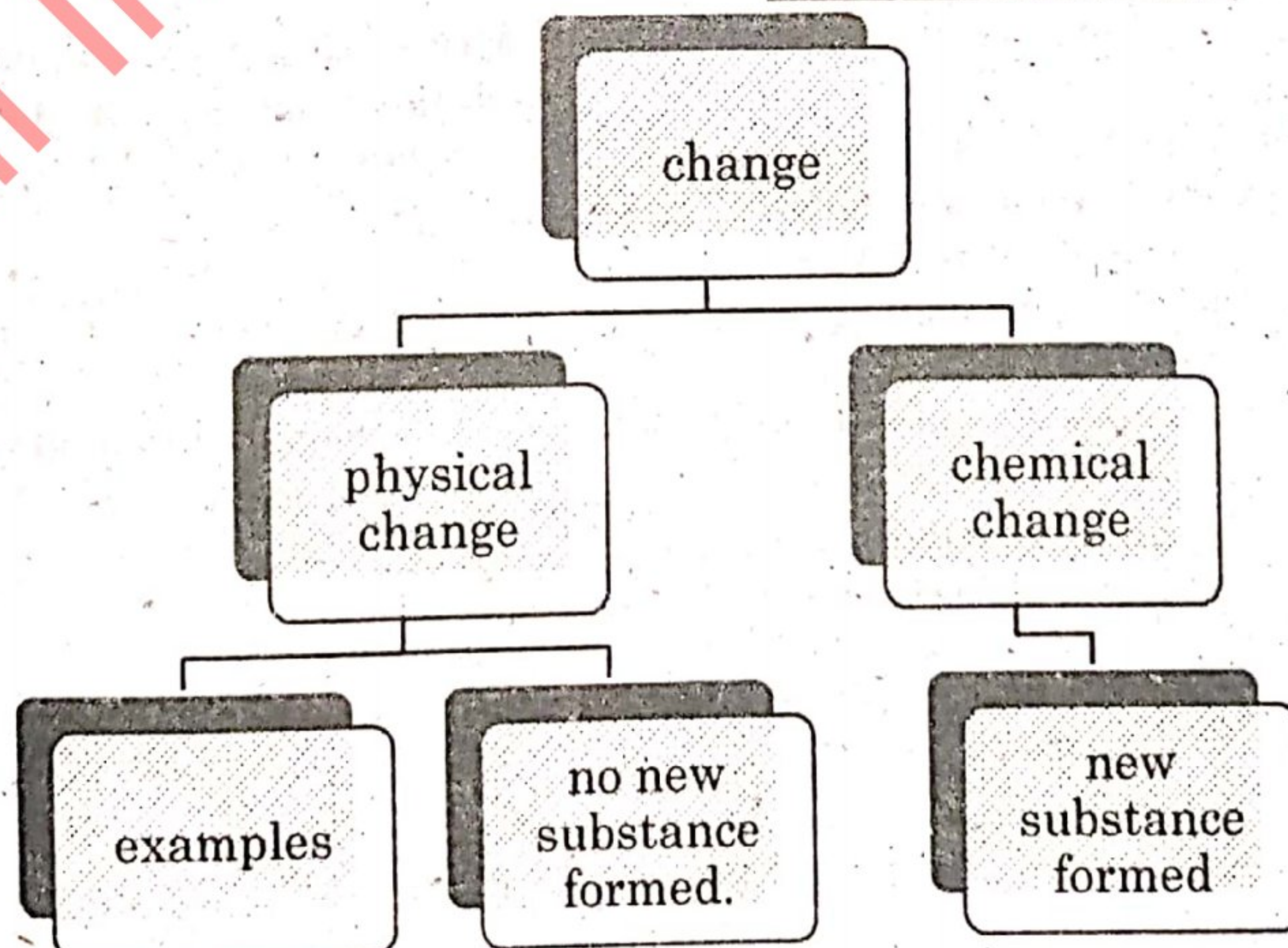
2. In the process of making chapatti there are three steps from A to B to C. Which stage is physical and chemical change? Give reason.

a. soaking. b. Making roti. c. Cooking on a tava/ pan.

c. Making a roti on tava is also a chemical change where the water present in the flour is dried and roti cannot be changed back to dough flour.



3. Complete the following charts.  
Example:





Chopping wood.

Melting.

Folding.

Rusting.

Burning.

Rotting.

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

a. Identify and explain the changes.

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

Answer:

a. During the burning of candle both changes take place combustion or burning is a chemical change while melting of wax is a physical change.

Physical change → Melting of wax  
Chemical change → Burning of wax

b. Eating of food is another example in which both physical and chemical changes take place. Or

Physical change → Breaking down of larger food particles into smaller particles

Chemical change → Digestion of food

5. During the process of digestion proteins are taken down into amino acid and molecules (you must have read it in the chapter of digestion in grade 6)

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

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

Answer:

a. Digestion is a chemical change in which food is broken down and energy is produced.

b. Photosynthesis is a process in plants where a chemical change takes place.

6. 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 oxygen?

Answer:

The mixture of air and fuels burnt in the engine of a car releasing energy for the car to move.

To do burning, an engine needs oxygen which comes from the air all around us.

7. Melting of butter is a change where a substance changes from a solid to a liquid state. Write a few more examples.

Answer:

- a) Melting of ice into water.
- b) Melting of wax.
- c) Melting of metals like Steel, gold and silver etc.
- d) Melting of glass.



Words	meanings	words	meanings
structure	ساخت	non metals	غیر دھات
matter	مادہ	symbol	نشان (علامت)
neutral	غیر جانبدار (تعدیلی)	melting point	نقطہ پگھلاؤ
center	مرکز	boiling point	نقطہ جوش
tiny	باریک	Color less	بے رنگ
entity	وجود	Odourless	بے بو
element	عنصر	Taste less	بے ذائقہ
periodic table	دوری جدول	flammable	آگ پکڑنے والا
Horizontal row	افقی قطار	ladder	یڑھی
vertical	عمودی	Center	مرکز
distribution	تقسیم	arrangement	ترتیب
metals	دھات	_____	_____

### A. MCQ (choose the correct option)

1. Neutrons carry

- a) no electric charges
- b) positive charges
- 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) electrons 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 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 a symbol N and the atomic number is 7. Its electronic configuration is represented as:

- a) 2,5
- b) 2,6
- c) 5,2
- d) 2,2

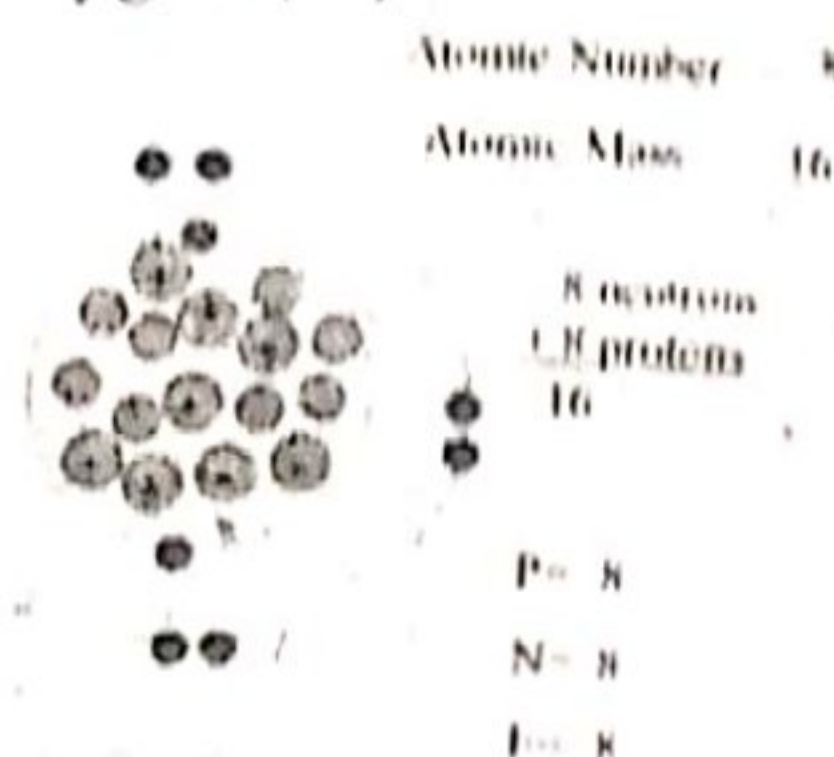
10. What is the sequence of the elements in the periodic table  ${}_3\text{Li}$ ,  ${}_4\text{Be}$ ,  ${}_2\text{He}$ ,  ${}_7\text{N}$ .

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

#### Short questions

1. an atom has an atomic number of 8 and a mass number of 16.
  - a. Determine the number of protons present in it.
  - b. Determine the number of neutrons present in it.
  - c. Determine the number of electrons present in it.

#### Oxygen (O)



Q2: find the meaning of periodic from the dictionary and explain the arrangement of elements into periods and groups in the periodic table.

Answer:

The property which repeats itself in equal intervals of time is called Periodic property.

Elements are arranged in the increasing atomic number horizontal rows are called periods while vertical columns are called groups.

#### 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.

Answer:

Atom:

The matter is made of tiny particles called atoms.

Structure of atom:

An atom consists of two regions:

The center of the atom is called the nucleus.

The nucleus contains protons and neutrons. Protons have positive charge, whereas neutrons have no charge means they are neutral.

The second largest region consists of electrons orbit around the nucleus in fixed shells. Electrons have a negative charge. The number of protons and electrons of an atom is always the same which makes an atom of neutral entity.



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

**Answer:**

Periodic table is an organized arrangement of the known chemical elements.

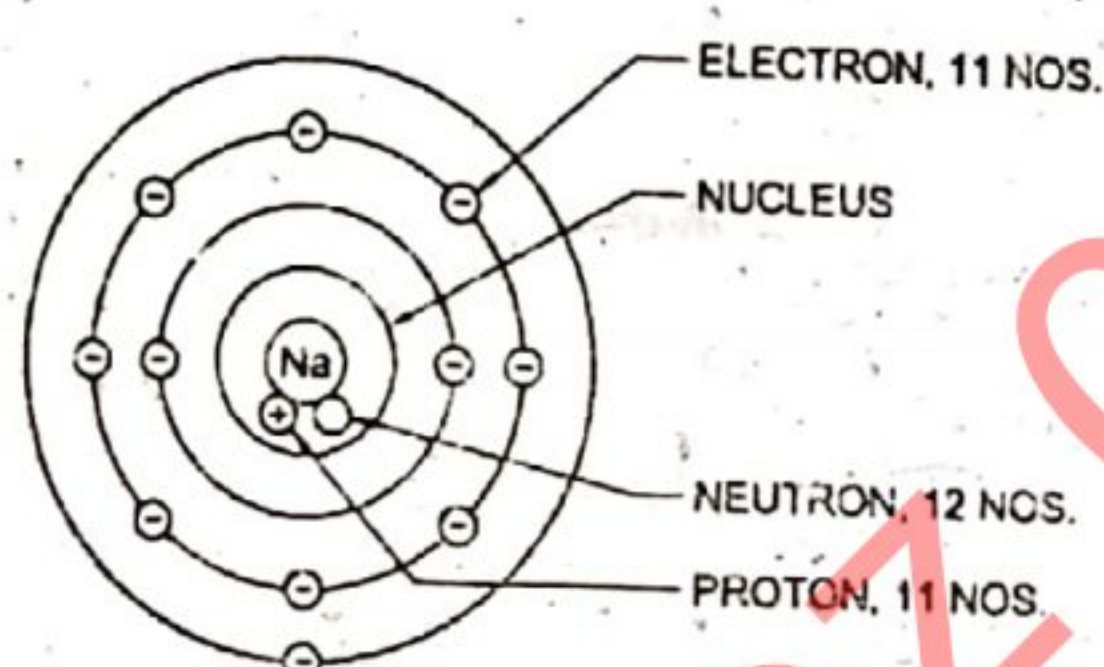
Elements are arranged in order of increasing atomic number.

Horizontal rows in periodic table are called periods that shows the same number of shells for the elements.

Vertical columns in periodic table are called groups, which show the number of electrons in the outermost shell.

### Structured Questions:

1. the diagram shown on the right is the structure of an atom.



a. recognise the atom.

**Answer:**

It is the atom of sodium (Na) of atomic charge or atomic number 11.

b. How many electrons are there in this atom?

hydrogen 1							helium 2
lithium 2 1	beryllium 2 2	boron 2 3	carbon 2 4	nitrogen 2 5	oxygen 2 6	fluorine 2 7	neon 2 8
sodium 2 8 1	magnesium 2 8 2	aluminium 2 8 3	silicon 2 8 4	phosphorus 2 8 5	sulfur 2 8 6	chlorine 2 8 7	argon 2 8 8
potassium 2 8 8 1	calcium 2 8 8 2						

**Answer:**

**Answer:** 11

c. What is the electrical charge on an electron (choose from negative, neutral, positive)

**Answer:** Neutral.

d. Give the names of the different levels of the electrons around the nucleus?

**Answer:**

The electrons of this element are arranged in the first three shells which are K, L, M.

2. The nucleus of an atom contains two types of particles.

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

**Answer:**

Nucleus contains protons and neutrons.


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

**Answer:**

As charge on protons is positive, while neutrons are electrically neutral. So charge on the nucleus is positive.

3. With the help of given diagrams draw the electronic arrangement of first 18 element showing the number of electron proton and neutron. Write the number of protons and neutrons in the nucleus and circle the electrons in the blue color. For Example:



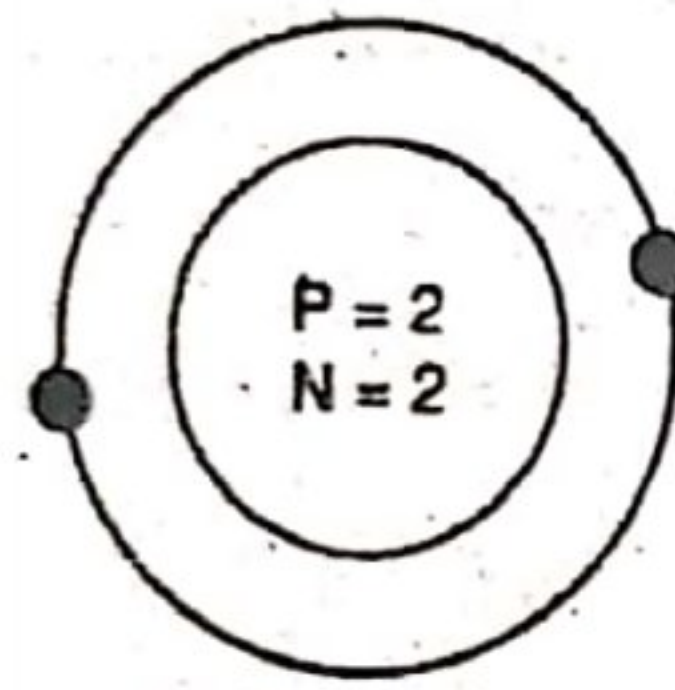
 Hydrogen



$p=1, N=0, e=1.$

Helium:

No. of neutrons = 2



Helium atom

$P=2, N=2, e=2.$

Lithium:



$P=3, N=4, e=3.$

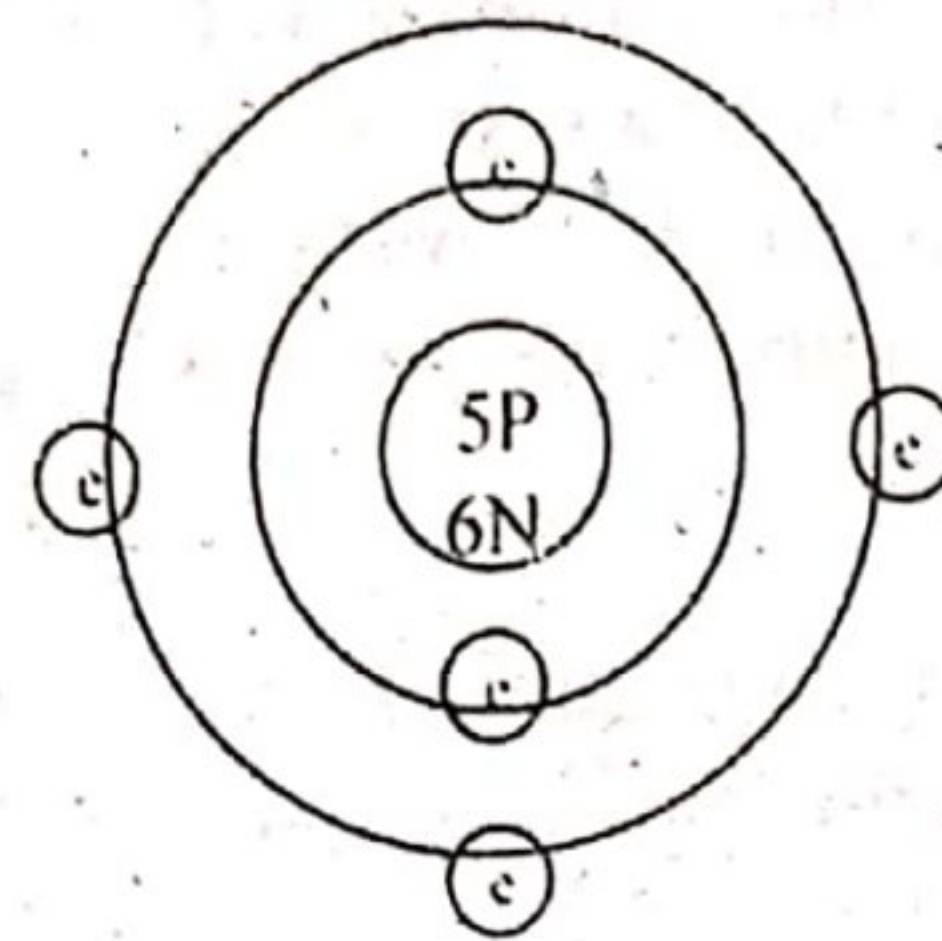
Beryllium:



Bohr Model of Beryllium

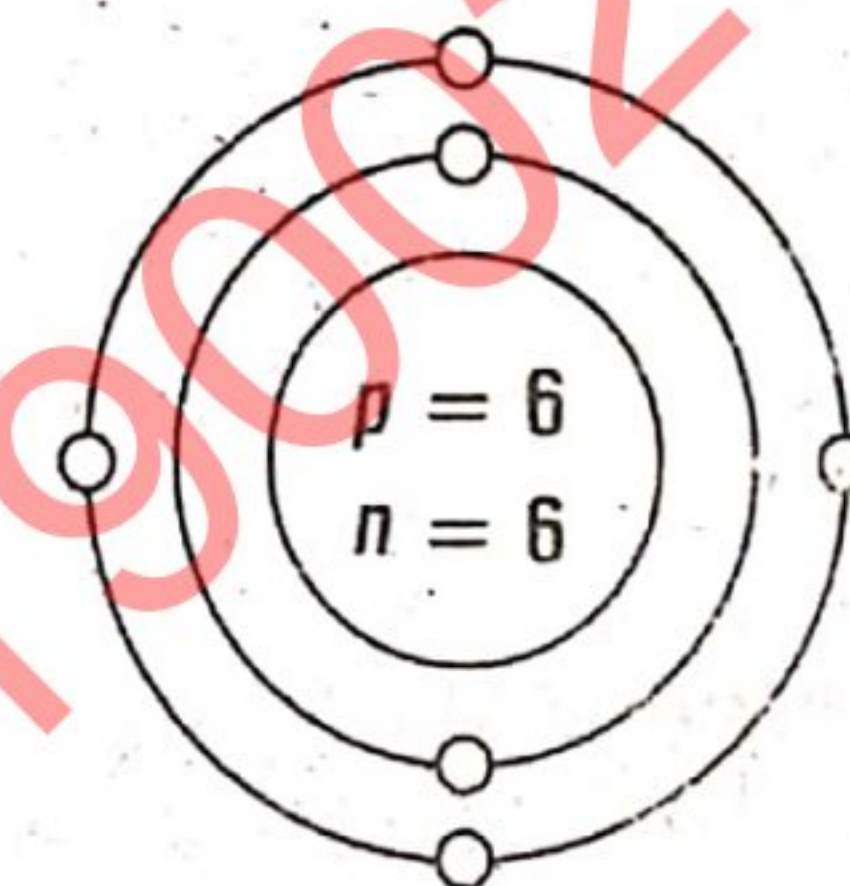
$P=4, N=5, e=4$

Boron:



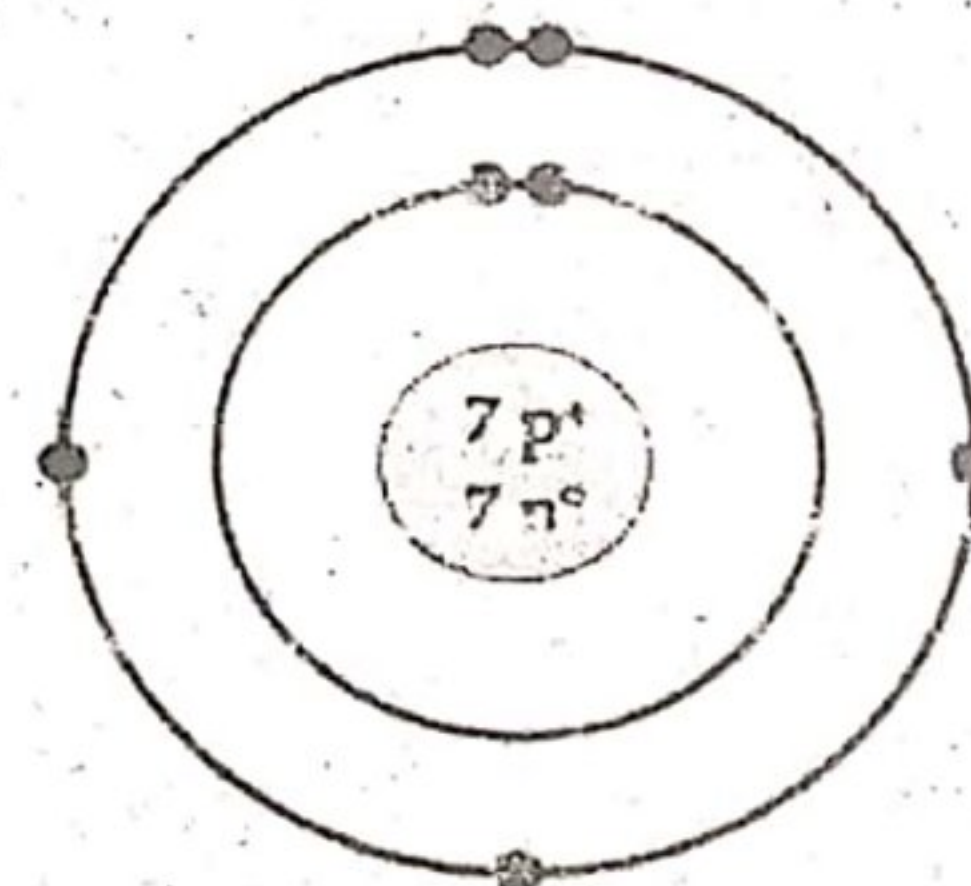
$P=5, N=6, e=5.$

Carbon:



$P=6, N=6, e=6.$

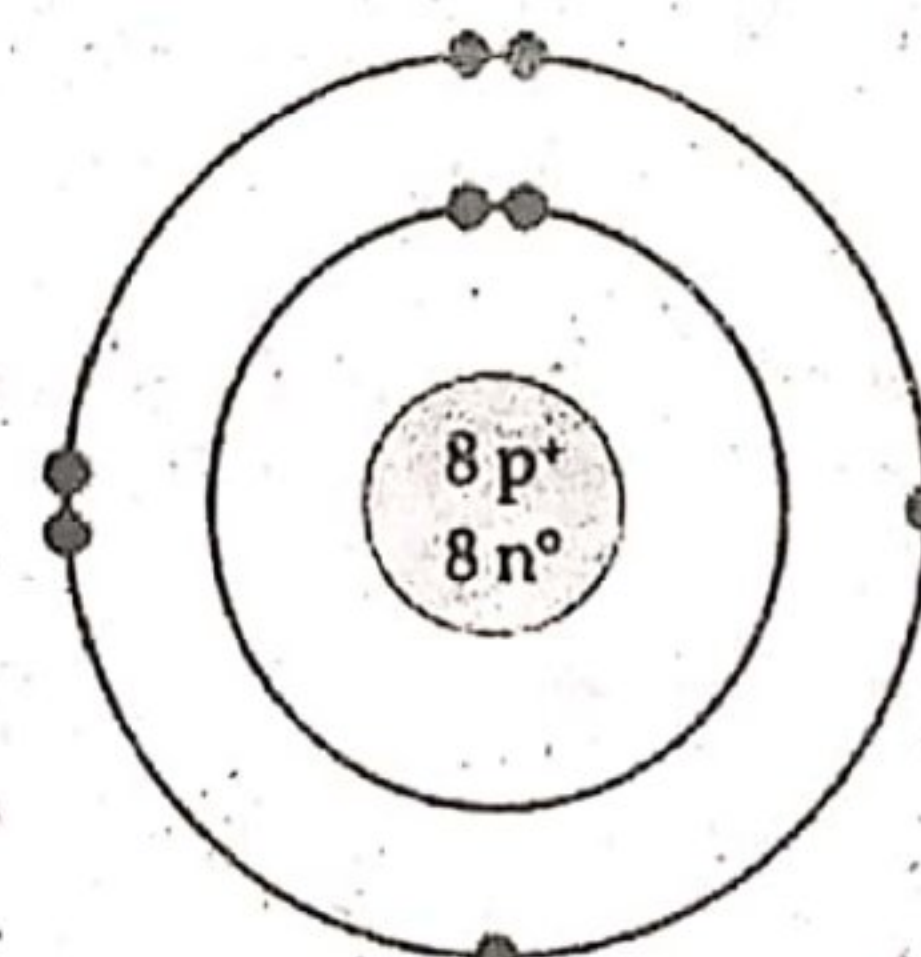
Nitrogen:



Nitrogen

$P=7, N=7, e=7.$

Oxygen:



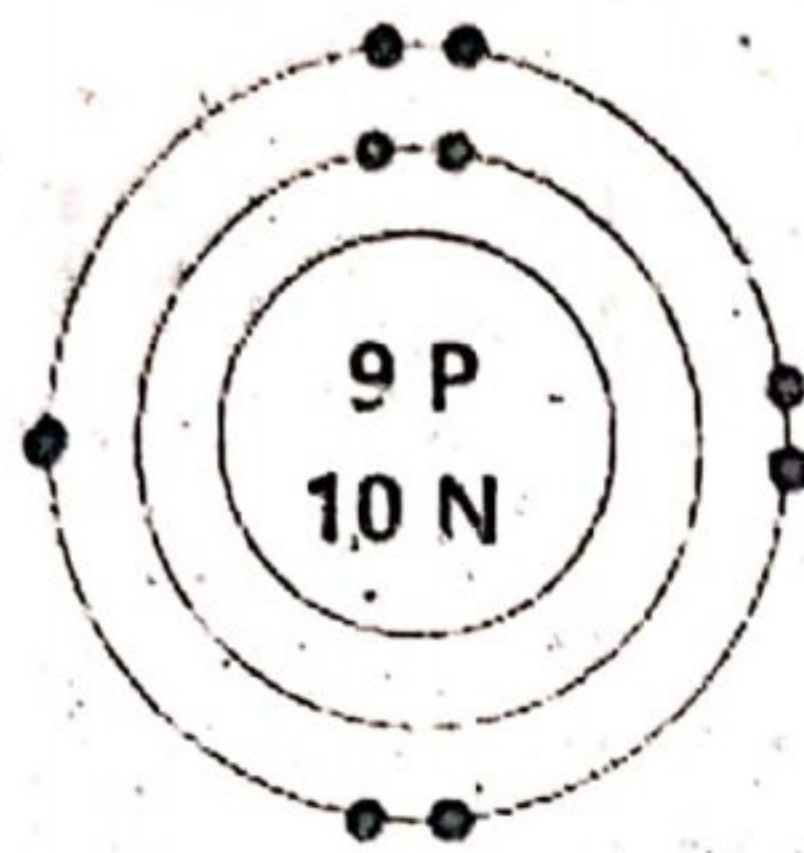
Oxygen

$P=8, N=8, e=8.$

Fluorine:

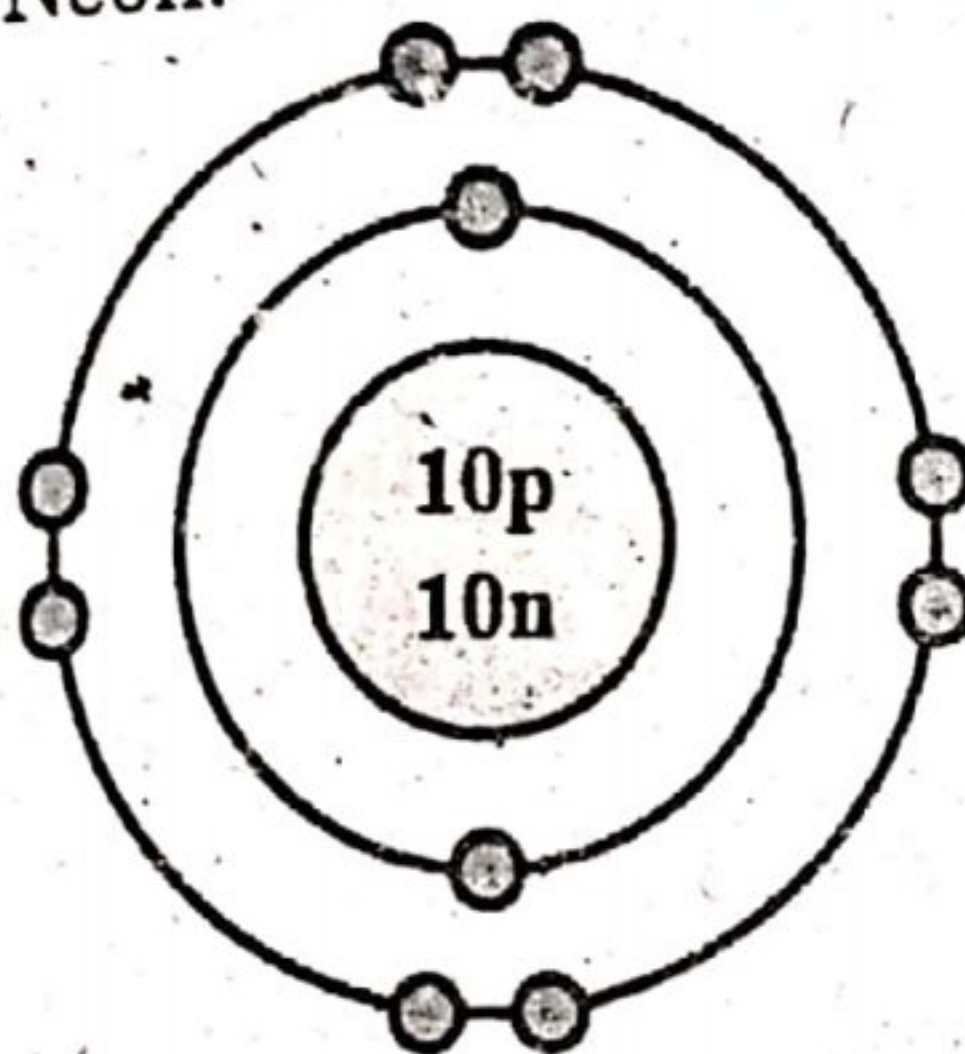


Bohr model for Fluorine atom



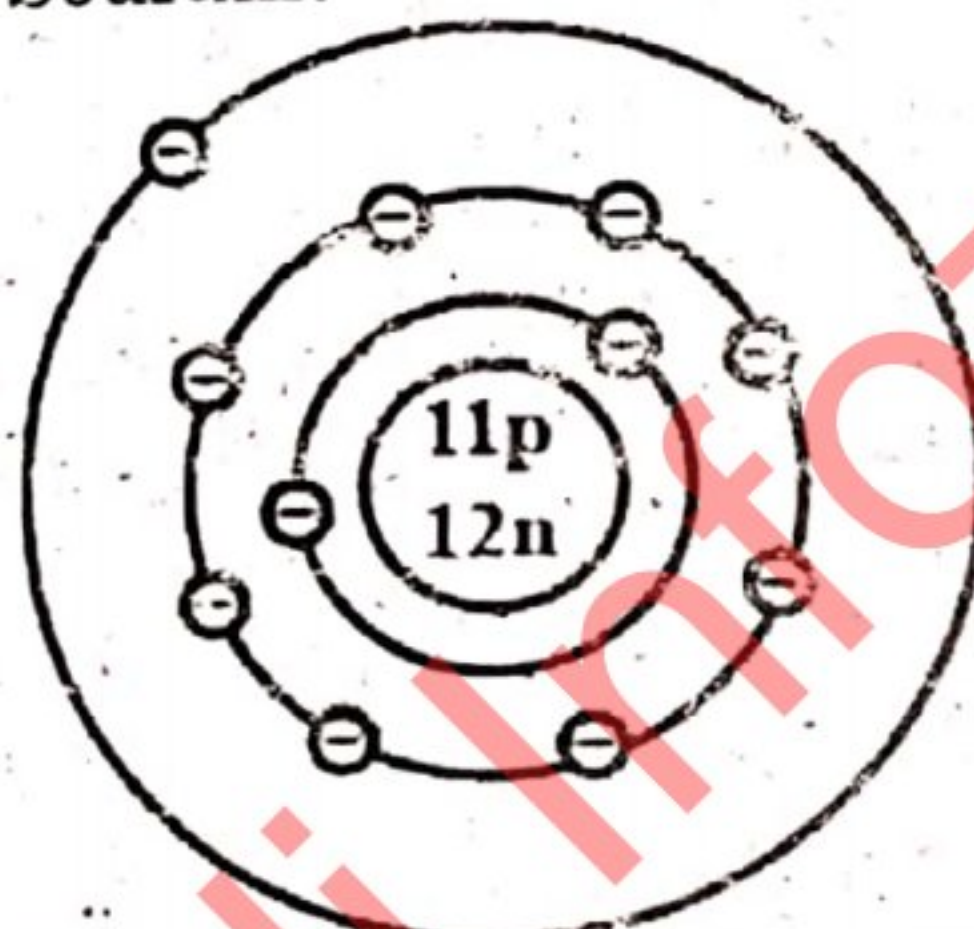
$P=9, N=10, e=9.$

Neon:



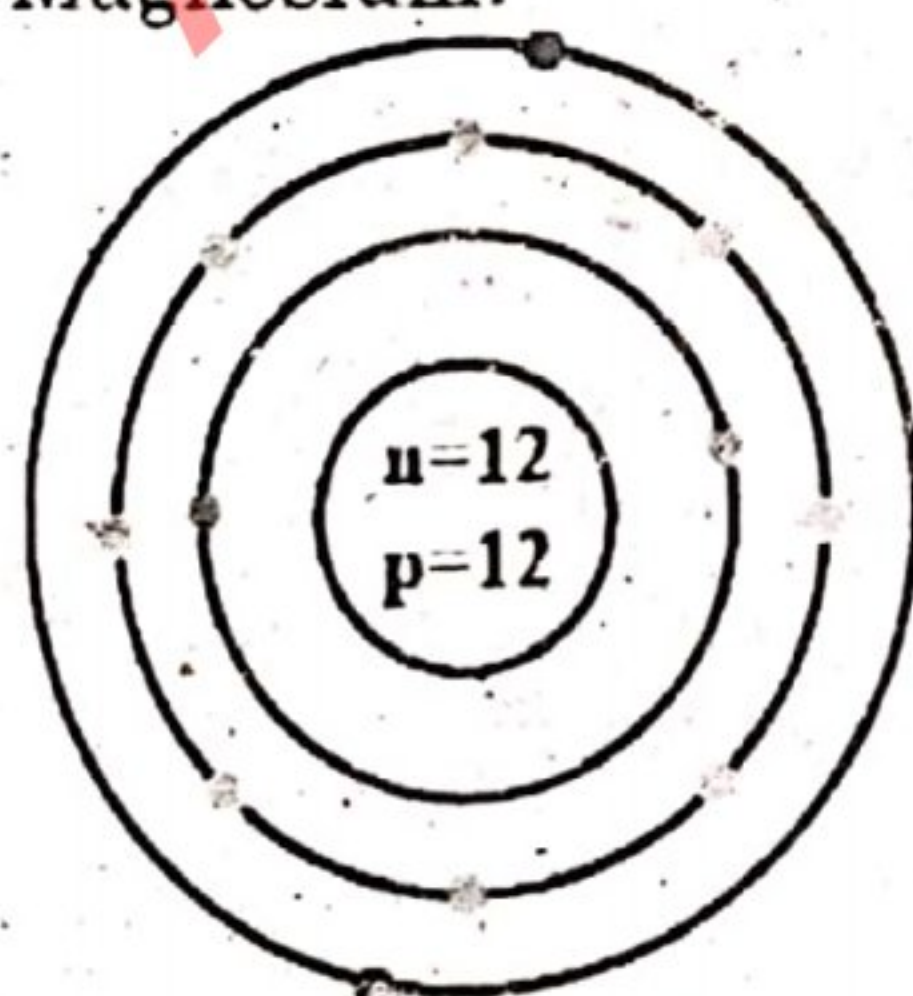
$P=10, N=10, e=10.$

Sodium:



The structure of sodium atom  $P=11,$   
 $N=12, e=11.$

Magnesium:



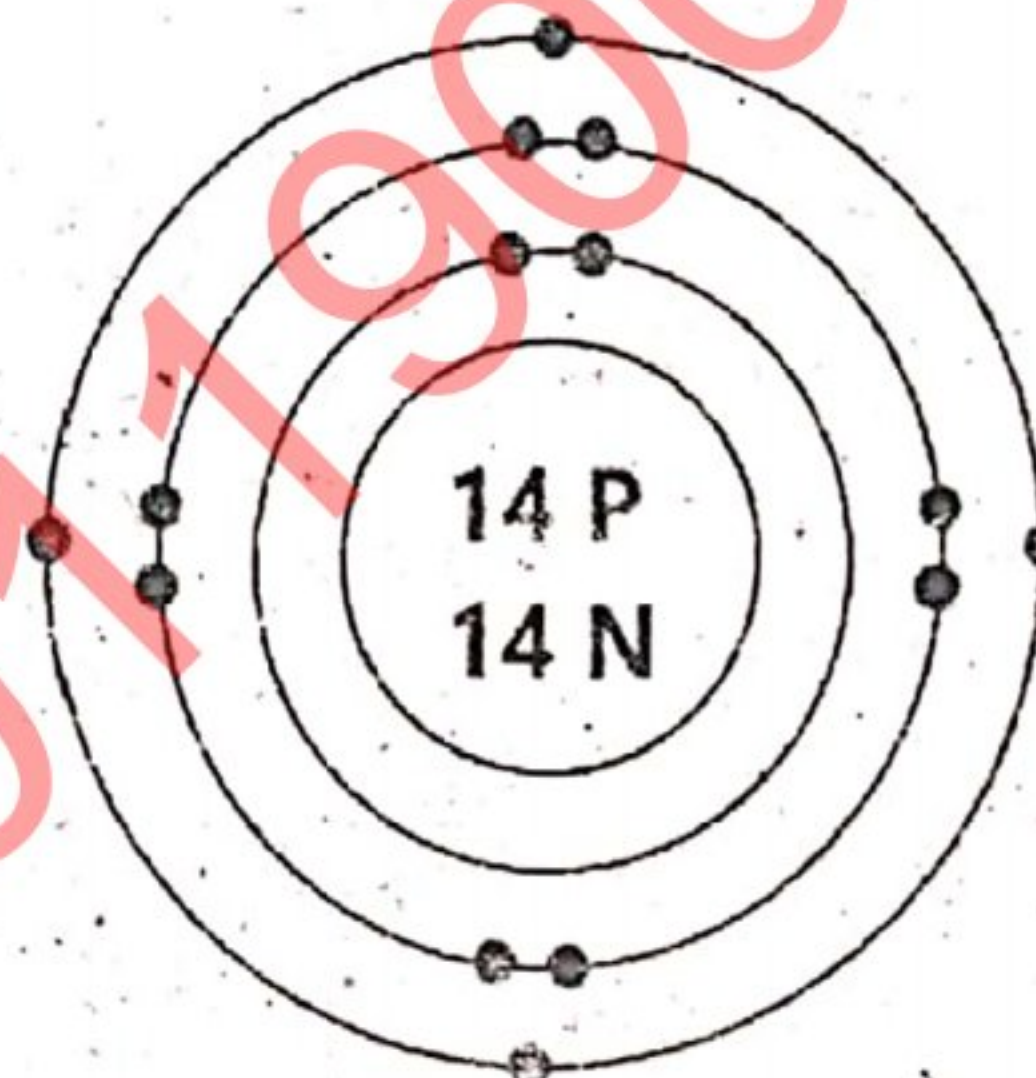
$P=12, N=12, e=12$

Aluminum:



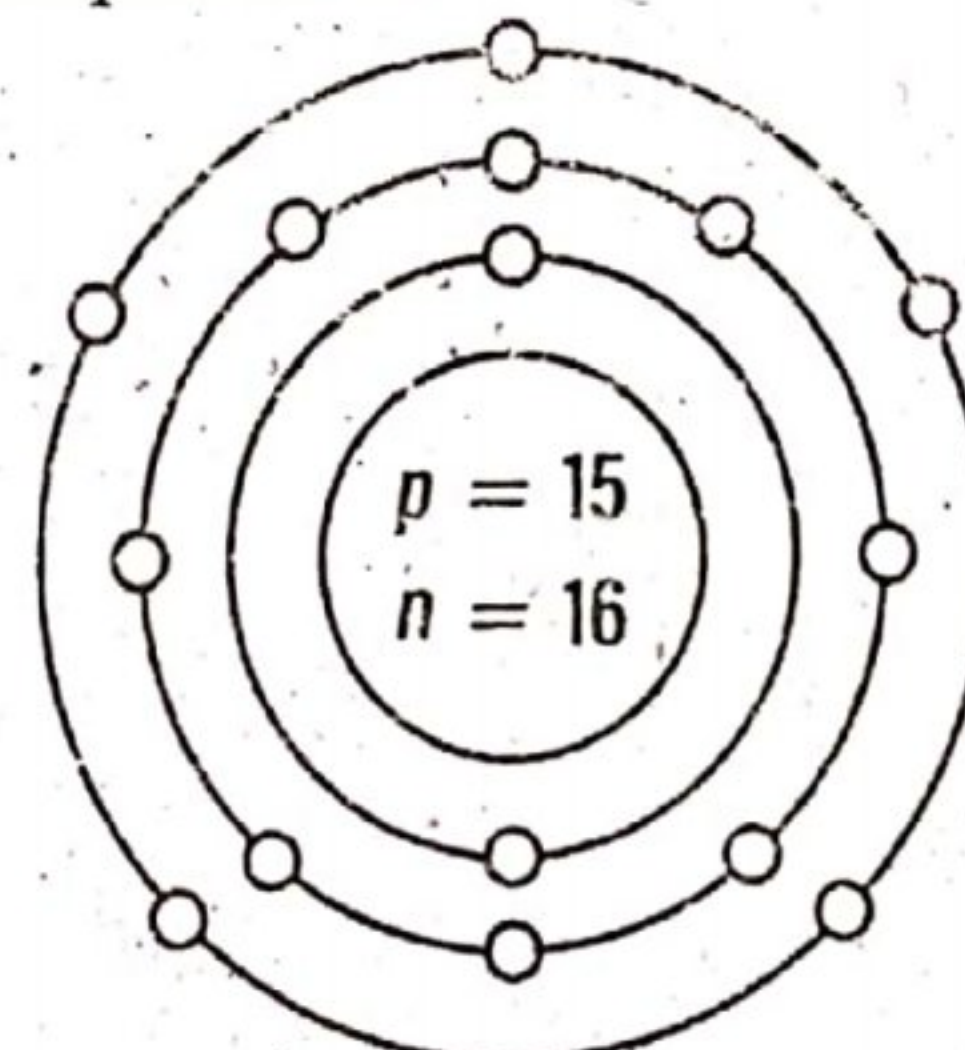
$P=13, N=14, e=13.$

Silicon:



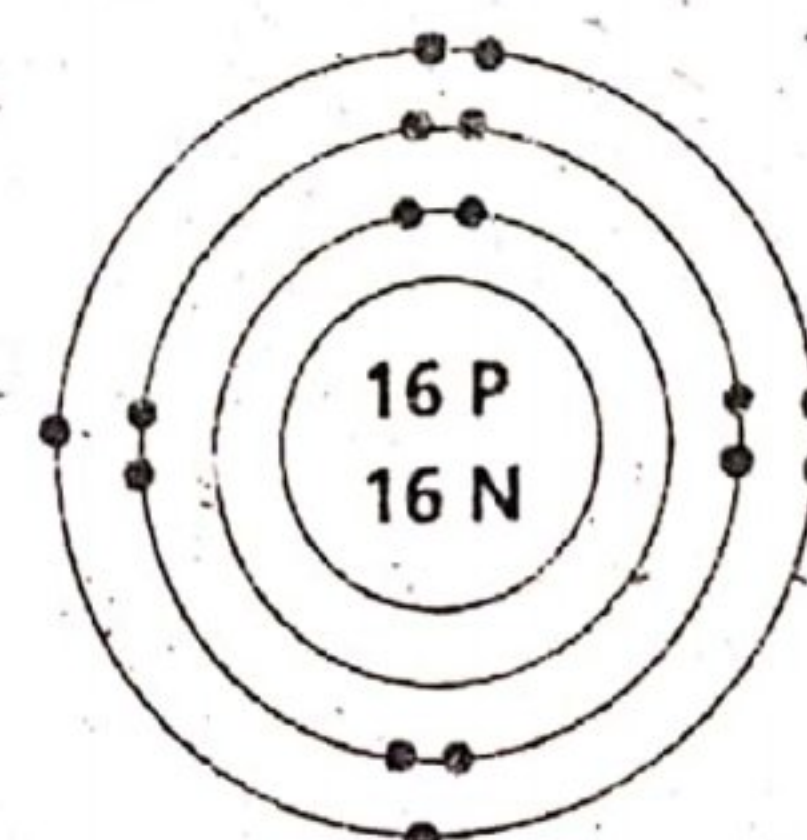
$P=14, N=14, e=14.$

Phosphorous:



$P=15, N=16, e=15.$

Sulphur:



$P=16, N=16, e=16.$



The diagram shows a central nucleus with 17 protons (P) and 18 neutrons (N). Surrounding the nucleus are three concentric circles representing electron shells. The innermost shell contains 2 electrons, the middle shell contains 8 electrons, and the outermost shell contains 7 electrons, for a total of 17 electrons.

Argon.

Words	Meaning	Words	Meaning
chemical bonds	کیمیائی جوڑ (باند)	chemical formula	کیمیائی فارمولا
Compounds	مرکبات	Symbolic	علامتی
Share	اشتراک	Representation	نمائندگی
Gains	حاصل کرنا	Mutual	باہمی
Lose	کھو جانا (خارج کرنا)	Attraction	کشش
neutral particle	تعدیلی ذرہ	Different	مختلف
Metal	دھات	Force	قوت
non metal	غیر دھاتی	Distance	فاصلہ

a) give up two electrons  
b) gain two electrons



- c) give up to 6 electrons
- d) considered stable and not react with other elements

6. Negative Ion is formed when an atom has

- a) gained a Proton
  - b) **gained an electron**
  - c) lost a Proton
  - d) lost an electron
6. Aluminum oxide is formed from aluminum ion  $Al^{+3}$  and an oxide ion  $O^{2-}$ . The formula of Aluminum oxide is
- a)  $AlO$
  - b)  $AlO_2$
  - c)  **$Al_2O_3$**
  - d)  $Al_3O_2$

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

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

9. The elements of group 2 loses:

- a) 1 electron
- b) **2 electrons**
- c) 3 electrons
- d) do not lose electrons

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

- a) Ions and their number
- b) atoms and their number
- c) molecules and their numbers
- d) **Valence Electrons and their numbers**

**B. Correct the statement if it is false.**

1. opposite charges attract each other.

**True**

2. ions with same charges are held together by electrostatic forces of attraction between them. **False**

Ans: ions with opposite charges are held together by electrostatic forces of attraction between them.

3. Chemical formula are used to describe the type of atoms only. **False**

Ans: Chemical formula are used to describe the valency of an atom.

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

**False**

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

5. Chemical bonds formed as a result of attraction between nucleus and Valence Electrons. **False**

Ans: Chemical bond is a mutual attraction between the nuclei and valence electron of different atom that binds the atom together.

#### Short questions

**Q.1 Why the valency of group 2 element is 2?**

Ans: The number of electrons in the outer shell of group 2 elements is two. So therefore its valency is 2.

**Q.2 By using valency write the chemical formula of carbon dioxide.**

Ans: Carbon dioxide is formed from carbon Ion ( $C^{+4}$ ) and an oxide Ion ( $O^{2-}$ ) the formula is  $C_2O_4$  or  $CO_2$

**Q.3 In the formation of ion, Why magnesium atom loses two electron?**

Ans: Magnesium is in group 2 element of the periodic table. So its valency is 2. Thus in the formation of an ion, magnesium loses two electrons.

**Q.4 How could you relate the formation of chemical bonds with Valence Electrons?**

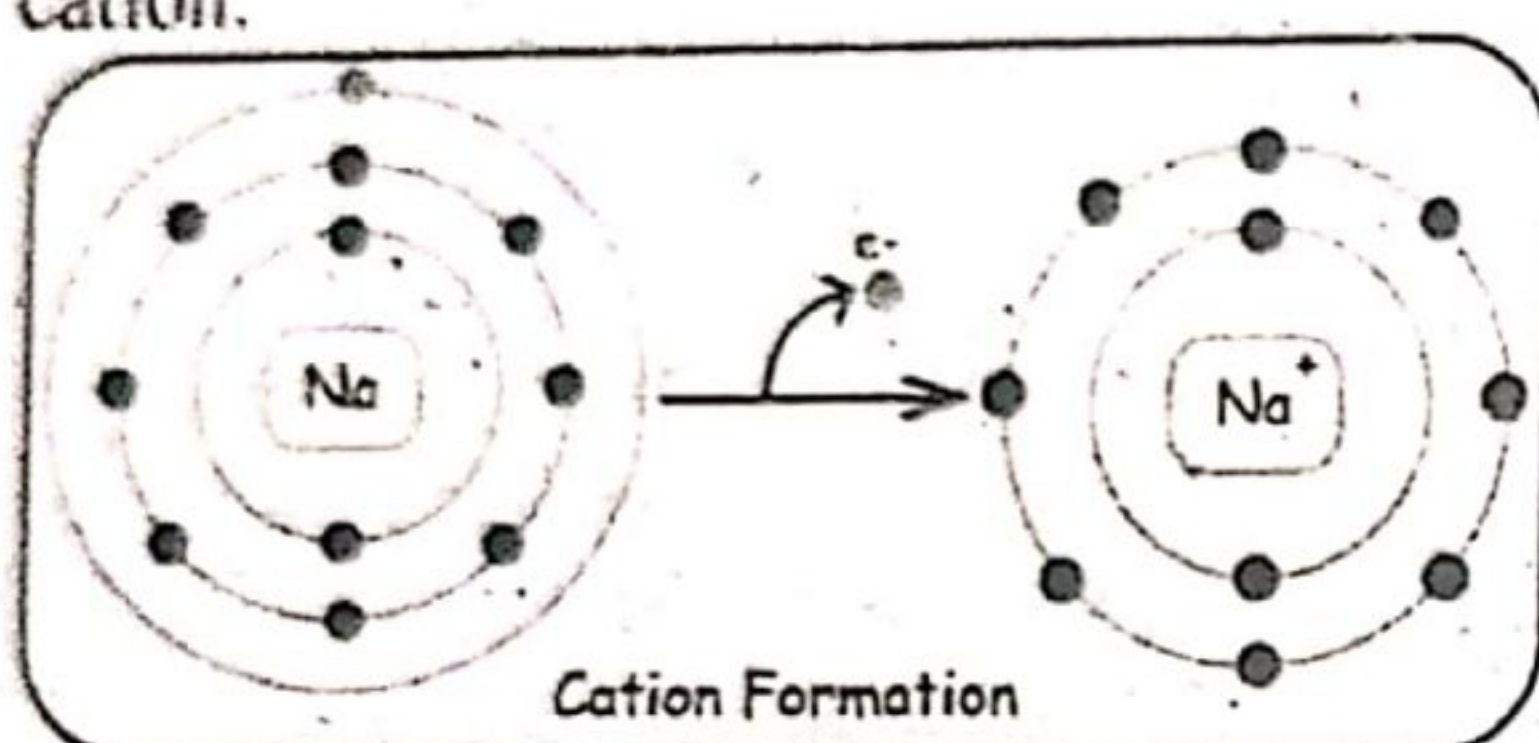
Ans: The valence electrons are involved in bonding of one atom to



another. The attraction of each atoms nucleus for the valence electron of the other atom pulls the atom together.

**Q.5** with the help of Venn diagram compare and contrast between cation and anion.

Ans: Cation means losing of electrons, which means cation has a positive charge.  
e.g sodium metal loses an electron and becomes positively charged ion called cation.



Na  
atom  
11  
protons  
Protons  
11  
electrons  
electrons

Na+1

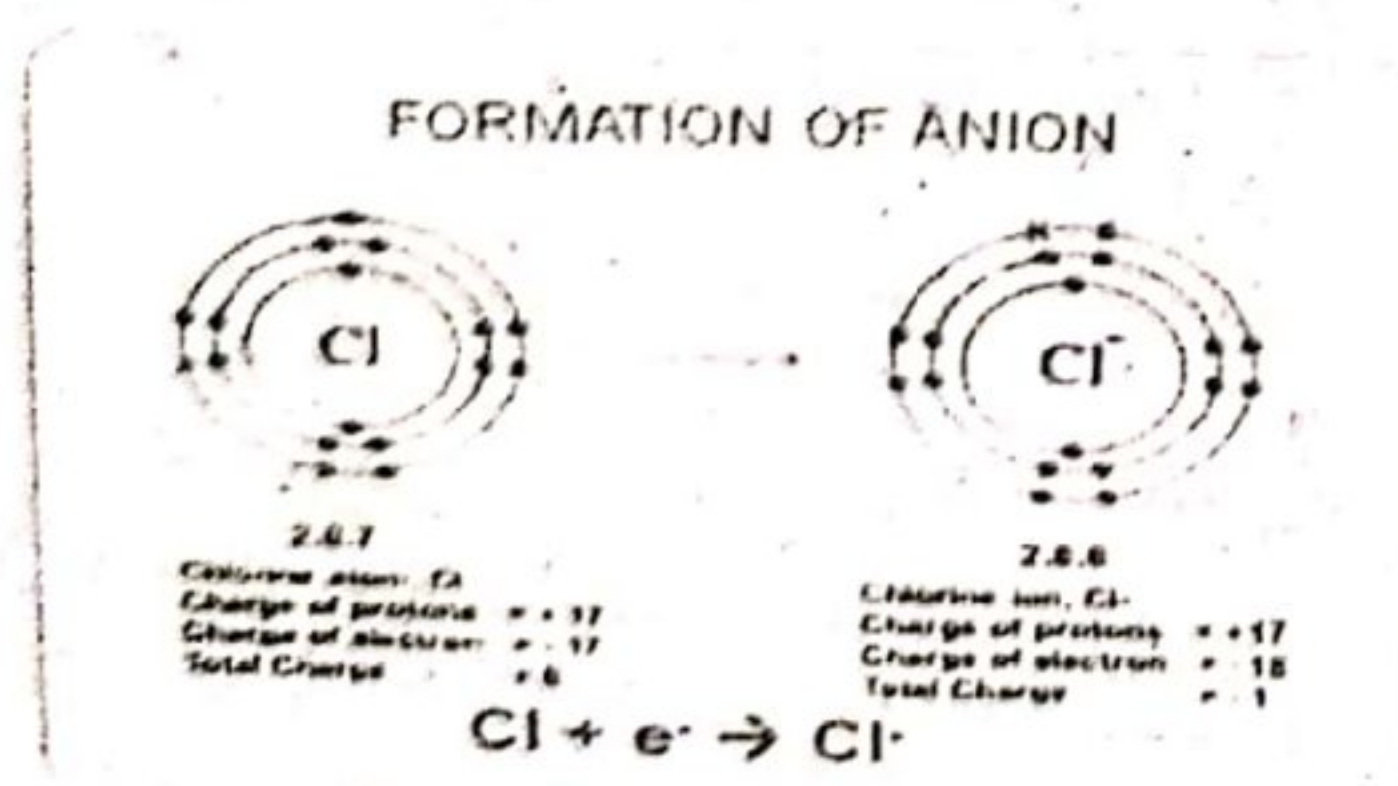
11

10

0 net  
charge  
charge

+1 net

**Anion** means gaining electrons, Which means anions have a negative charge.  
e.g chloride gains an electron and becomes a negatively charged ion called anion.



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

Ans: A chemical bond is a mutual attraction between the nuclei and valence electron of different atoms that binds the atoms together. The valence electrons are involved in bonding of one atom to another. The nuclear attraction of each atom for the valence electrons of the other atom pulls the atom together.

**Q7:** How are hydrogen ion  $H^+$  and oxygen ion  $O^{2-}$  different from each other?

Ans: Hydrogen ion means that hydrogen lose one electron while Oxygen ions means that oxygen gains two electrons.

### Long Questions

**Q.1** Write the steps for writing a chemical formula illustrate with few examples.

Ans: Steps for writing chemical formula

- Write down the symbols of the elements.
- Above each symbol write its valency.
- Cross the valency of both elements.
- If the valency can be simplified divide them by the least valency.
- Write the chemical formula.

Examples:

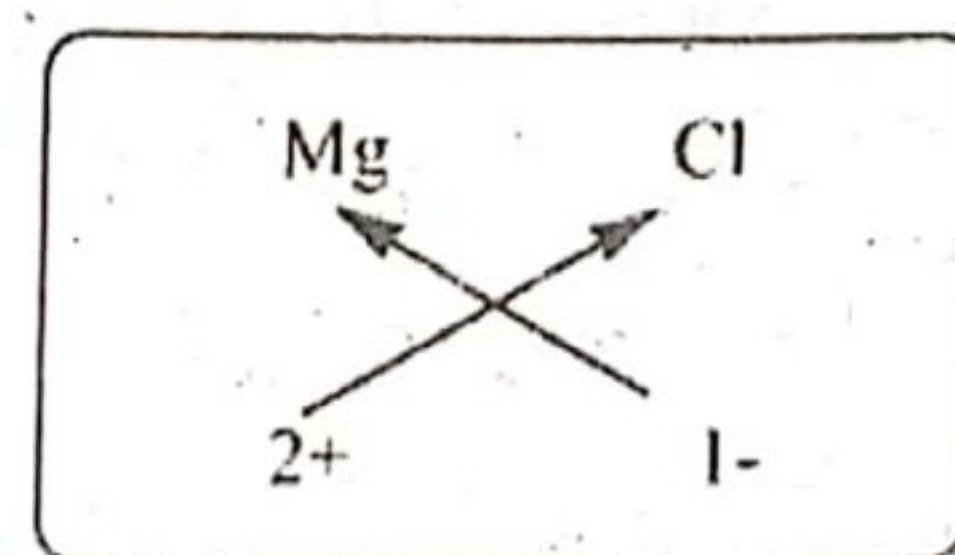
$MgCl_2$ :

Mg Group = II A

Cl Group = VII A

SYMBOL

CHARGE



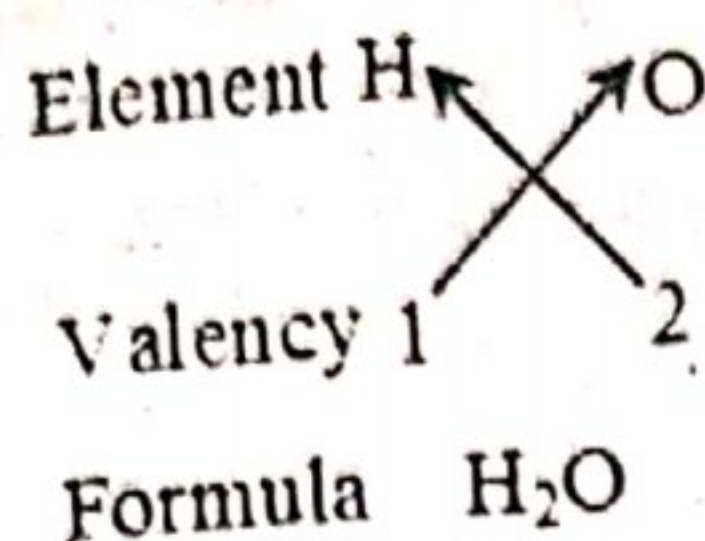
$MgCl_2$



H<sub>2</sub>O:

H Group = I A

O Group = VI A



NaCl:

Na Group = I A

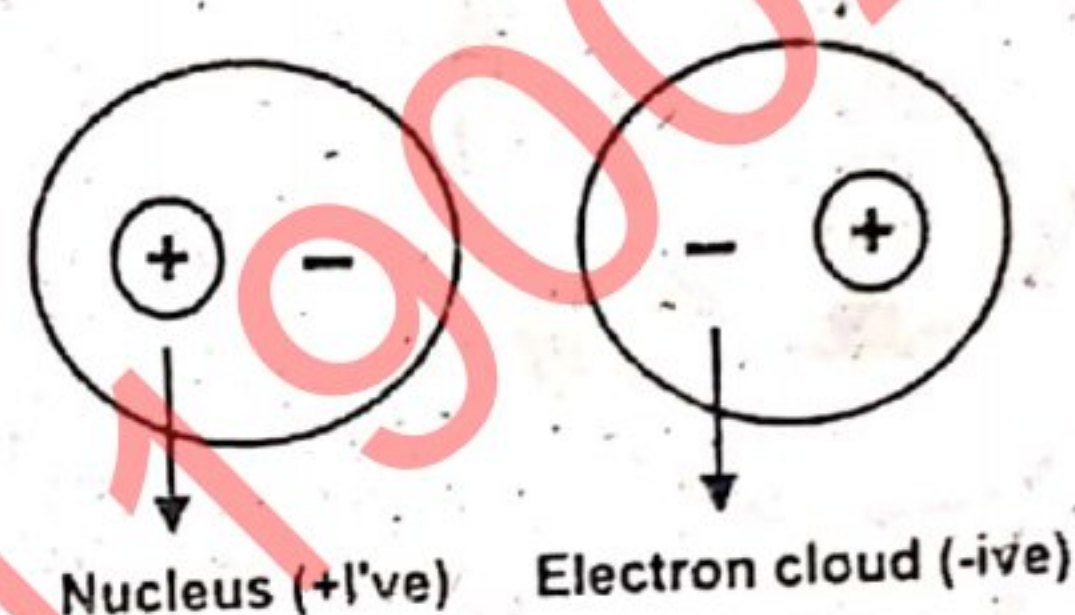
Cl Group = VII A



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

Ans: Chemical bonds:

A chemical bond is a mutual attraction between the nucleus and valence electrons of different atoms that binds the atom together. The valence electrons are involved in bonding of one atom to another. The attraction of each atoms nucleus of the valence electron of the other atom pulls the atoms together.  
e.g



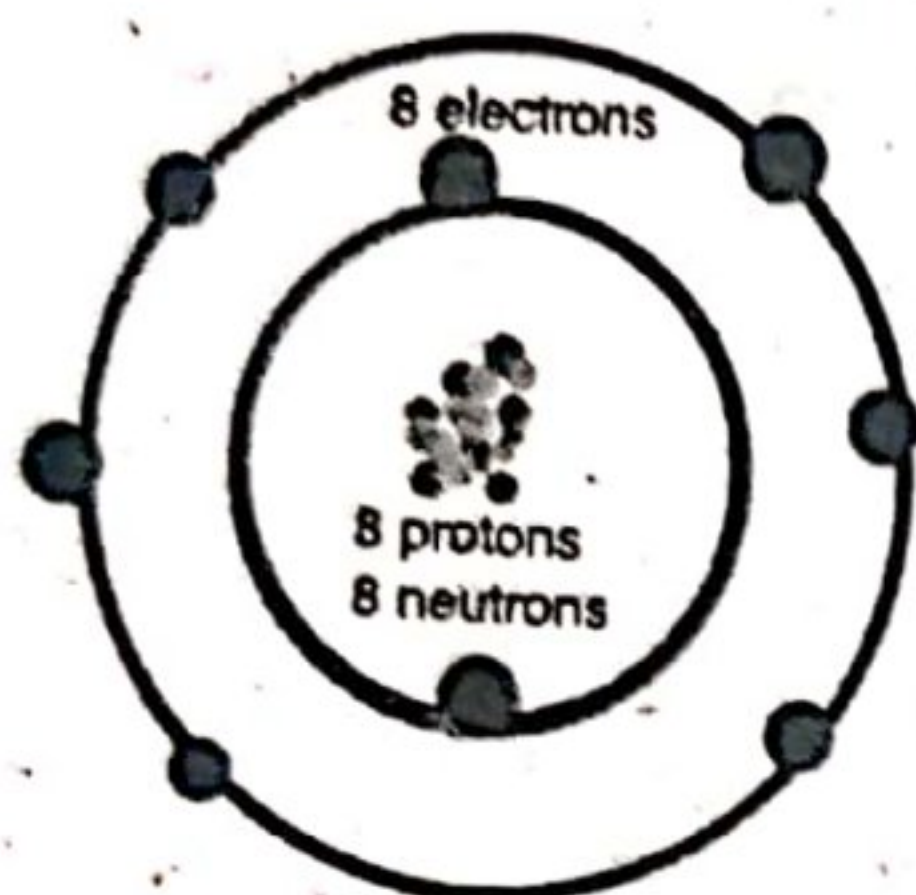
### Formation of chemical bond E. Structured Questions.

Q1. Complete the table.

Element.	Atomic number	electronic distribution	Outermost electrons	In forming a compound the atom.	valiancy
Nitrogen	7	2,5	5	Gain or share 3 electrons	3
Beryllium	4	2,2	2	loses two electrons	2
Neon	10	2,8	8	non-reactive	0
Magnesium	12	2,8,2	2	loses two electrons	2
Lithium	3	2,1	1	loses one electron	1
Helium	2	2	2	non-reactive	0



Q2: Magnesium and oxygen react to form magnesium oxide (MgO). electronic arrangement for the two elements is:



a. Answer these Question is about magnesium atom.

1. does it gain or lose electrons to form in iron.

Answer: It loses two electrons to form an ion.

2. how many electrons are transferred?

Answer: It transfers two electrons.

3. Is the ion form positive or negative?

Answer: As magnesium loses two electron it bears positive ion.

4. What changes does ion have?

Answer: Magnesium have + 2 ion.

b. Repeat for oxygen atom.

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

Answer: Oxygen gains electrons to form an ion.

2. How many electrons are transferred?

Answer: Oxygen gains two electrons.

3. Is the ion form positive or negative?

Answer: Oxygen forms Negative ion





4. What charge does the ion have?

Answer: It gains two electrons which gives it negative charge it becomes -2 ion.

Q3 The four circles Below represent atoms of four common elements. Study carefully and then write the chemical formula of each of the 8 molecules shown in the chart. Water  $H_2O$  has already done for you.

	Hydrogen-H	Carbon-C	Oxygen-O	Nitrogen-N
$H_2O$				
$O_2$				



NO		NO <sub>2</sub>	
CO <sub>2</sub>		H <sub>2</sub>	

## Unit 7

## Solutions

Words	Meaning	Words	Meaning
Solution	محلول	Tarnished	دائغ دار
Mixture	آمیزه	Vinegar	سرکه
Dissolve	حل	Procedure	طریقہ کار
Solute	منحل	solubility	حل پذیری
Solvent	محلول	Distinguish	فرق
Homogeneous	یکساں	saturated solution	سیر شدہ محلول
Tincture	رنگ دینا	Temperature	درجہ حرارت
Antiseptic	جراثیم کش	Pressure	دباؤ
Jewellery	زیورات	Composition	بتاؤٹ
aqueous solution	آبی محلول	Attract	کشش
Mineral	معدنیات	Separate	علیحدہ
Activities	سرگرمیاں	Layer	لہر
Dilute	ہلکا	Concentration	ارکاز
Cleaning	صفائی	Crystallization	قلم کاری
Concentrated	مد سکر	Squeezes	سکڑنا
Aim	مقصد	Steering	ہلانا
Cleaning	صفائی	grinding	پیشا

## Exercise

Qa. MCQ 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 then its capacity to dissolve is is:

- a) Saturated
- b) Unsaturated
- c) Supersaturated
- d) Aqueous



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

- 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**

Ans: The substance in which the substance dissolves in Greater amount is called solution.

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

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

c. Dissolving the solute can be faster by studying the mixture. **True.**

d. The chances of solubility between two like substances are more challenging than the unlike substances. **False.**

Ans: The chances of solubility between two unlike substances are

more challenging 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.**

### Short Questions

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

Ans: A saturated solution is a solution in which the maximum amount of solute has dissolved in the solvent at a given temperature. While an unsaturated solution is a solution in which the solute has completely dissolved in the solvent leaving no remaining substance.

2. Bilqees was preparing her morning coffee. She adds hot water and sugar to her coffee. Which dissolves and makes it sweeter to taste.

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

Ans: Yes, her cup of coffee is considered a solution.

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

Ans: Hot water is solvent while sugar and coffee is the solute.

Q3 How increase in temperature speed up the dissolving process?

Ans: As we know that solubility increases with increase in temperature. Therefore increase in temperature speeds up the dissolving process.

Q4 What happens when solution becomes supersaturated?

Ans: When solution becomes supersaturated, no more solute can dissolve in it.



**Q5** In gasses, solubility increases with increase in pressure. Give a daily life example.

Ans: The solubility of carbon dioxide in carbonated beverages under normal pressure is low, when it is subjected to higher pressure, a lot of carbon dioxide gas gets dissolved in it.

**Q6** How do nature of solvents have an effect on the solubility?

Ans: Chemical compounds with similar chemical features will dissolve in one another. While chemical compounds with unlike chemical features cannot dissolve in one another.

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

Ans: As we know that chemical compounds with unlike chemical features cannot dissolve in one another.

So a layer of oil formed at the surface of the water.

**Q8** How increase in temperature affects the solubility of gases?

Ans: The solubility of gases in liquids decreases with increase in temperature.

### Long Questions:

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

Ans: The solubility of most solid solutes increases with increase in temperature. If the temperature is lowered, the solute becomes less soluble. More solute can be dissolved with increase in temperature.

For examples: less sugar dissolves when the temperature is less. When

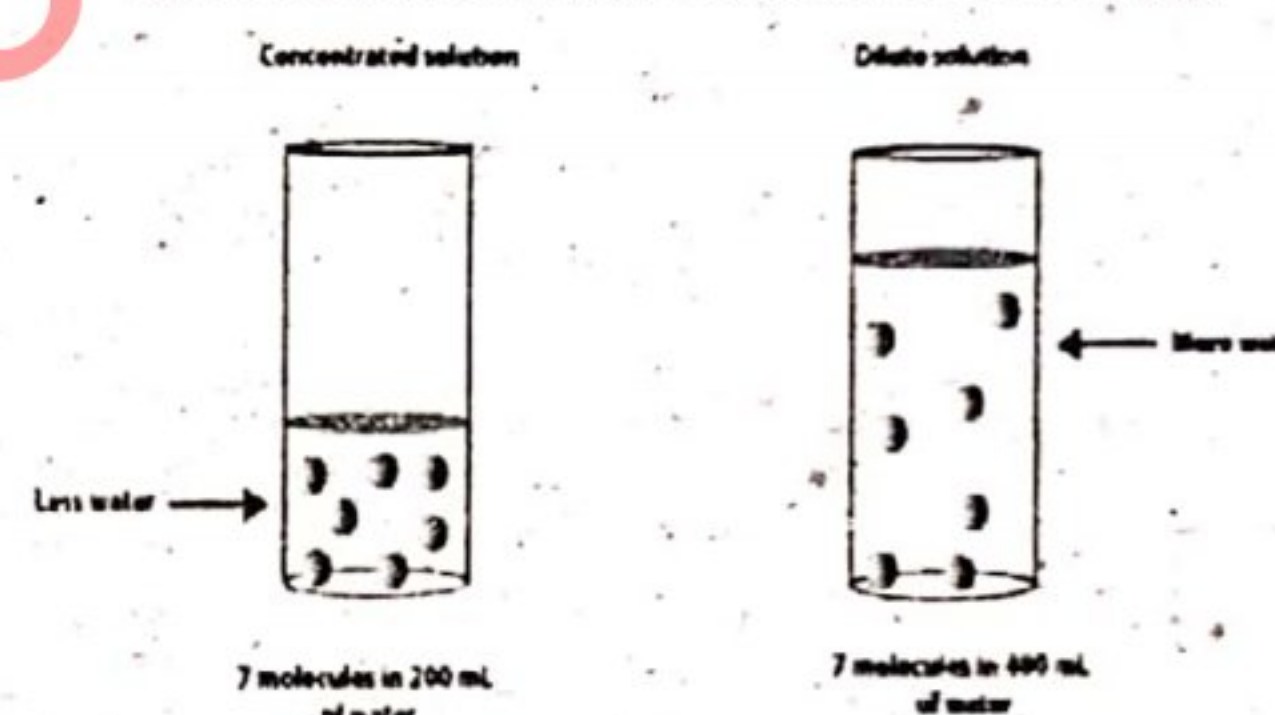
the temperature of water rises, more sugar is dissolved.

**Q2.** Explain the formation of saturated and supersaturated solution.

Answer:  
when salt (sodium chloride) is added to water to make a solution slowly and gradually. When maximum amount of NaCl has been dissolved in the water at a given temperature, A saturated solution is formed. But when the temperature rises, its solubility increases. Thus more salt can be added to the saturated solution with an increase in temperature. This type of solution is called supersaturated solution.

### Structured Questions

1. Look at the beakers of concentrated solutions:



Amount of solute = 10

ml Amount of solute = 10ml

Amount of solvent =

20ml Amount of solvent = 40ml

Colour = ?

Colour = ?

2. How will you change dilute solution to concentrated solution?

Ans: We can make the solution concentrated by heating it and evaporating the excessive liquid. Thus the solute will remain the same and solvent will be decreased making a concentrated solution.

Amount of solute = 10

ml Amount of solute = 10ml

Amount of solvent =

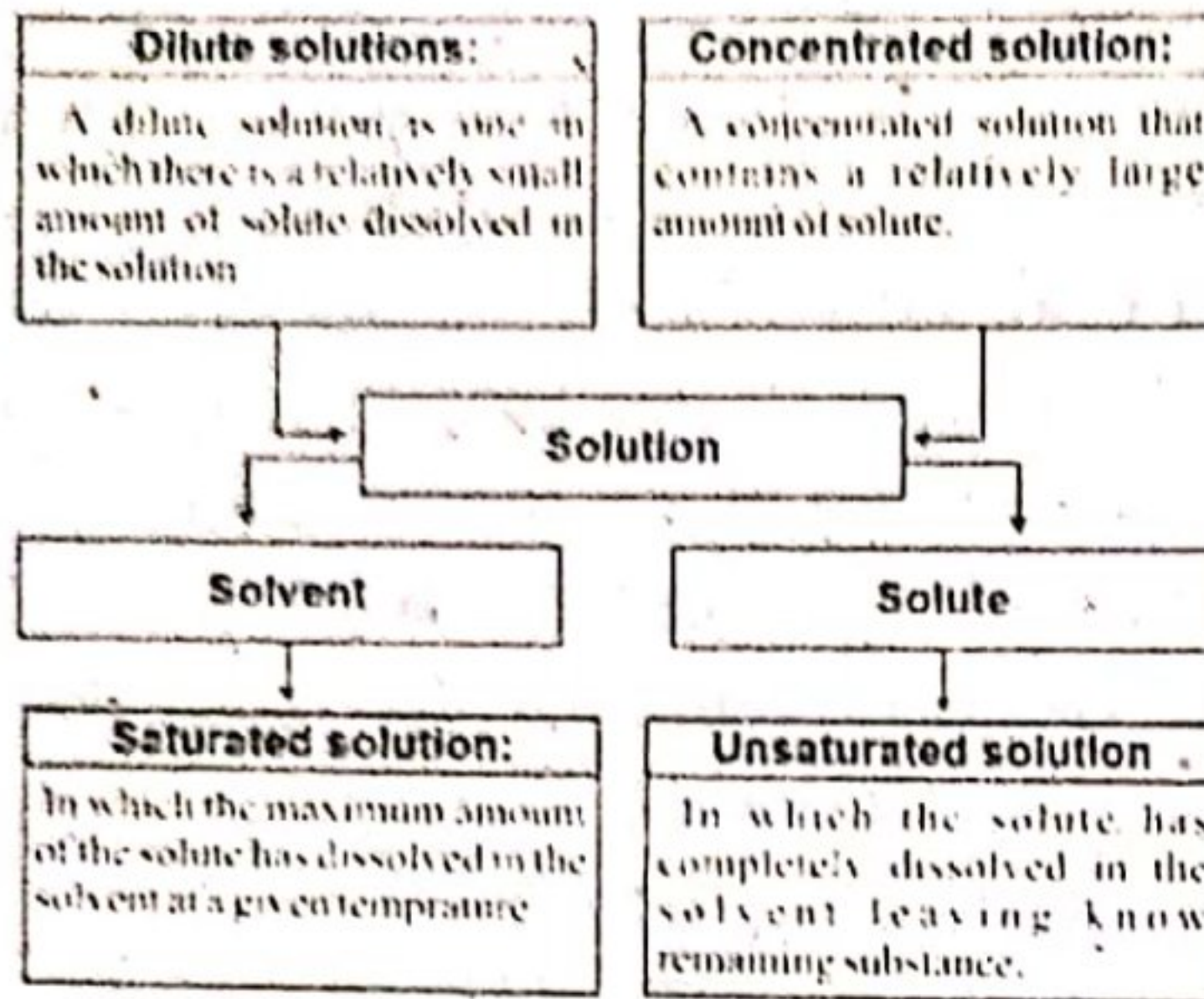
40ml Amount of solvent = 20ml



Colour=?

Colour =?

2. (a) Write a definitions in the empty boxes.



B. Name the factors affecting the solubility and how these factors affect it;

Factors affecting the solubility:

The nature of solute and solvent:	the temperature:	the pressure:
Chemical compounds with similar features will dissolve one another.	Solubility of solute increases with increase in temperature.	Solubility of gas increases with increase in pressure.

## Unit: 8

## Force And Motion

Words	Meaning	Words	Meanings
Force	قوت	Perpendicular	عموداً
Motion	حرکت	Parachute	چھتری
Movement	تحریک	Resistance	مزاہمت
Distance	فاصلہ	Tension	تناؤ
Astronaut	ماہر فلکیات	Friction	رگڑ
Space	خلا	Up thrust	اچھال کی قوت
Rest	آرام	Normal	نارمل
Speed	رفتار	Muscular force	عضلاتی قوت
International	بین الاقوامی	Weight	وزن
System	سistem نظام	Reaction	رد عمل
Unit	یونٹ اکائی	Balloon	غبارہ
Measurement	تیمائش	Work	کام
horizontal line	افقی لکیر		
vertical line	عمودی لائن		
Pull	کھینچنا		
Push	دھکیلنا		
Gravity	کشش ثقل		



## Exercise

## A. Choose the correct options

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 seconds with speed of 30 m/s. Then it cover distance is:
  - a) 30m
  - b) 3m
  - c) 300m
  - d) 150m
4. Which of the following animal has the highest running speed?
  - a) Horse
  - b) Turtle
  - c) Cheetah
  - d) silver ant
5. Every action has reaction equal in magnitude but \_\_\_\_\_ In direction.
  - a) Opposite
  - b) Perpendicular
  - c) Parallel
  - d) Anti-parallel
6. Unit of speed is
  - a) N
  - b) m/s
  - c) Kg m/s
  - d) Kg m
7. If a body covers equal distance in equal interval of time the speed will be
  - a) increasing
  - b) decreasing
  - c) Uniform
  - d) Zero
8. You draw distance time graph for a moving car and get straight line parallel to time axis then speed of 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 forces
  - 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 in string

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

1. Action and reaction forces never balance each other. **False.**  
Action and reaction acts on two different bodies can not balance each other.
2. Action and reaction force acts on same body. **False.**  
Action and reaction force acts on different bodies.
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 a non-contact force. **True.**

## C. Short Questions.

1. Define average speed. write SI unit of speed.

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

$$\text{average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

$$\langle v \rangle = \frac{s}{t}$$

$$\text{unit of } v \text{ (average speed)} = \text{m/s}$$



Q.2 If a cyclist covers 15 km distance in 1.5 hour. What is his speed in kilometer per hour (km/hr.) and in meter per second (m/s)?

Given Data:

Distance =  $s = 15\text{ km}$

Time =  $t = 1.5\text{ hr.}$

Required Data:

Speed =  $v = ?$

Solution:

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

$$V = \frac{s}{t}$$

$$V = \frac{15\text{ km}}{1.5\text{ hr}}$$

$$V = 10\text{ km/hr.}$$

As

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

$$1\text{ hr} = 60\text{ min}$$

So

$$1\text{ hr} = 60 \times 60\text{ s}$$

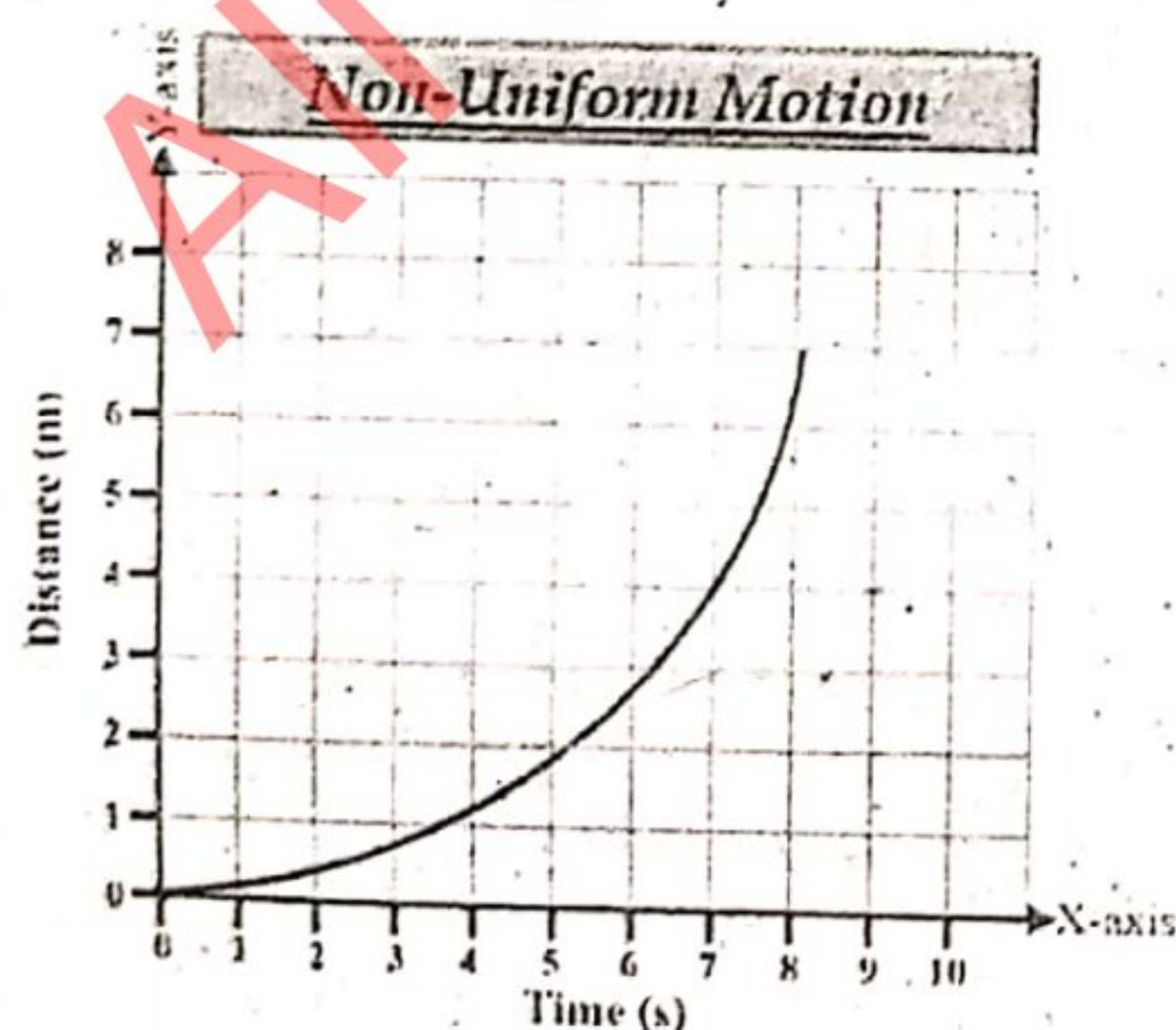
$$1\text{ hr} = 3600\text{ s}$$

$$V = 10\text{ km/hr.} = 10 \times 1000\text{ m} / 3600\text{ s}$$

$$V = 2.77\text{ m/s}$$

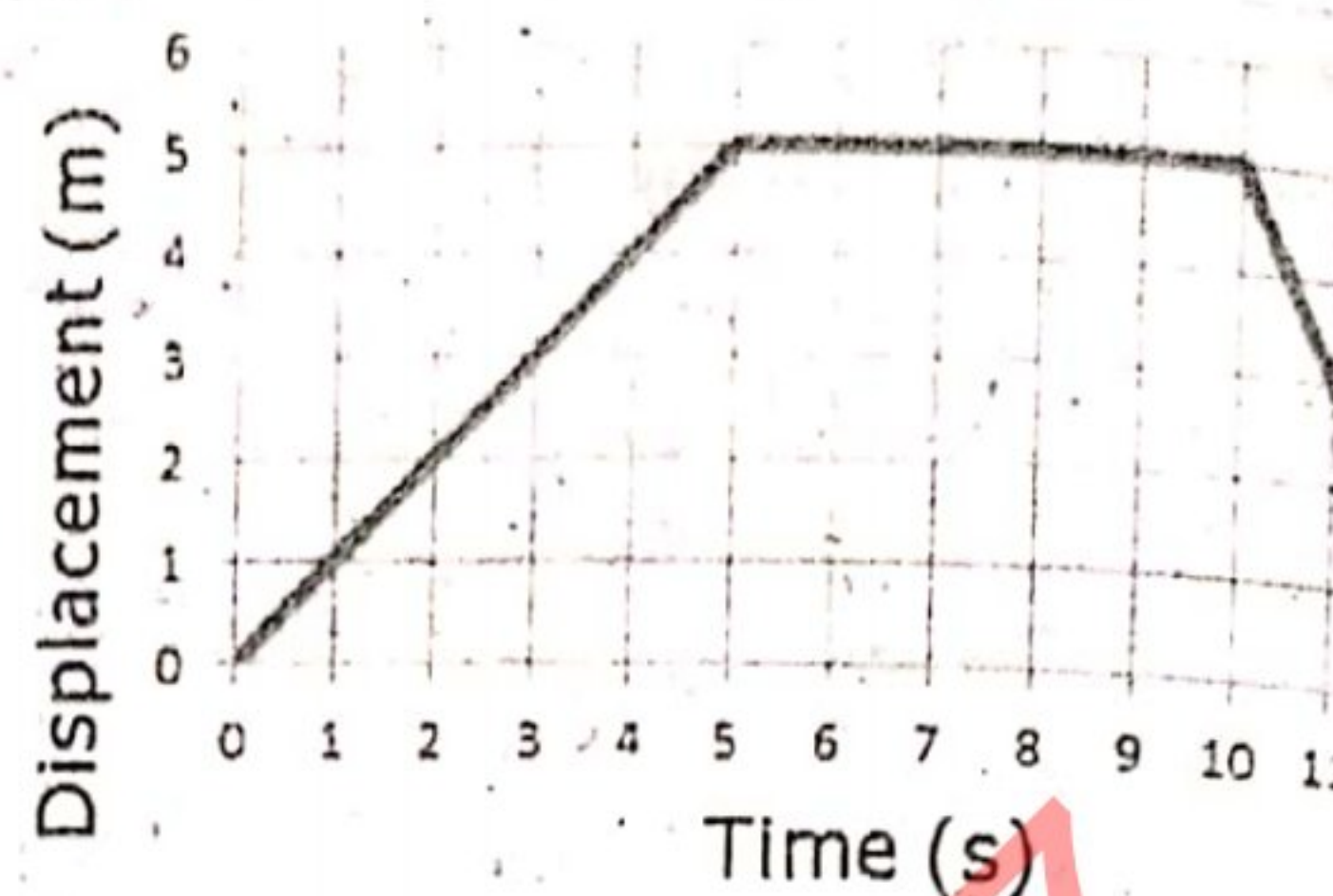
Q3. Draw the distance time graph for increasing speed of the car?

Ans: Distance time graph for increasing speed is:



Q4. A car is moving with uniform speed, driver apply brakes to slow it down after sometime and finally stop.

Sketch a distance time graph to represent this motion of car.



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

Ans: As we know that action and reaction forces act on two different bodies. So they cannot cancel each other.

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

Ans: During flapping their wings, Birds apply a force (action) on air in backward direction, While air exerts a reaction force on birds in forward directions.

Q7. Define force and its SI unit.

Ans: Force:

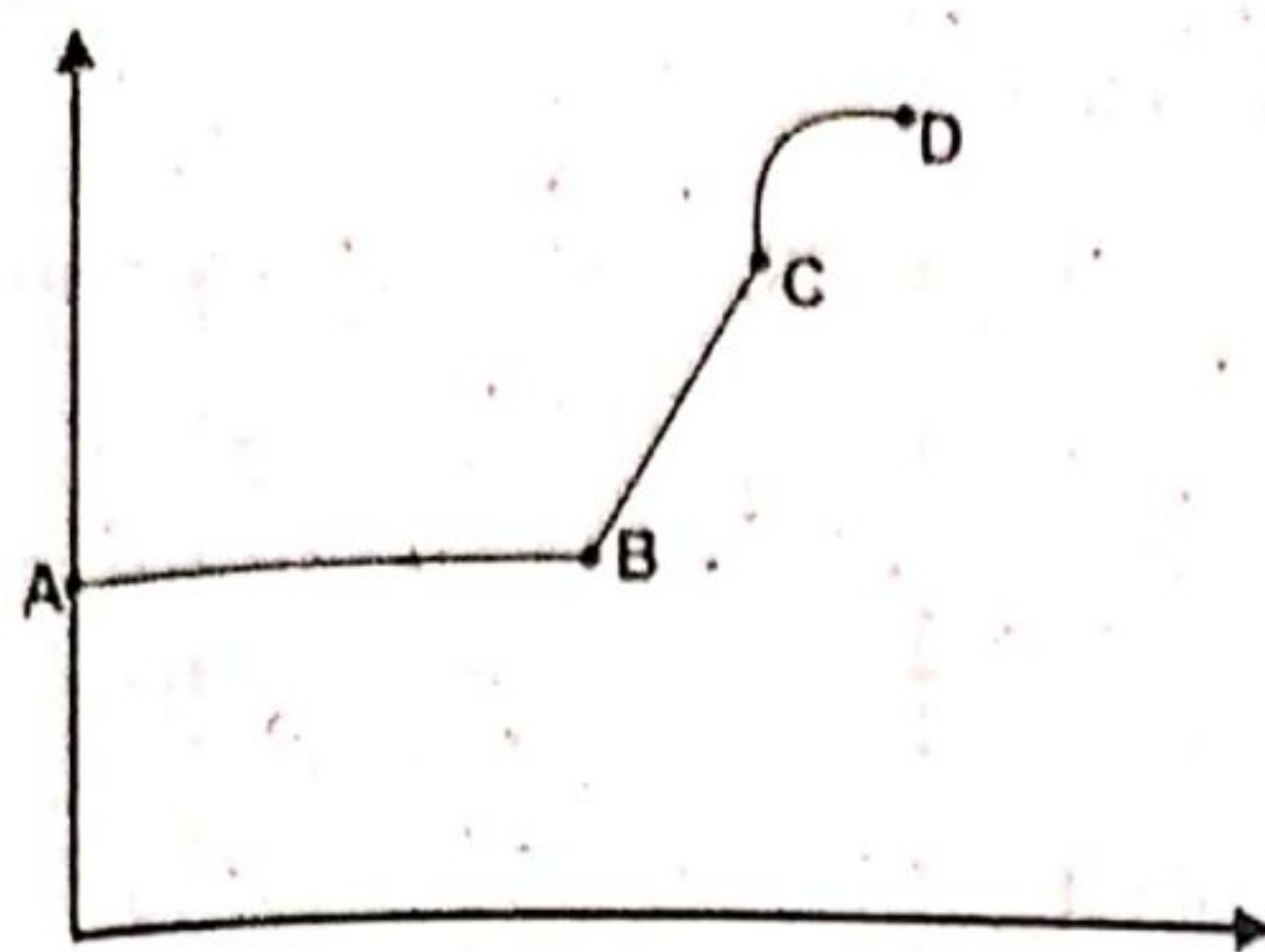
Force is an agent that pulls and push an object.

In SI unit of force is Newton (N). Which is "if a body of mass 1kg is pushed and its speed is increasing at rate of 1m/s in each second then force applied on it has value of 1N".

Q8. Look at the distance time graph.

- Which part is representing uniform motion.
- Which part is representing increasing speed.
- Which part of the body is at rest.

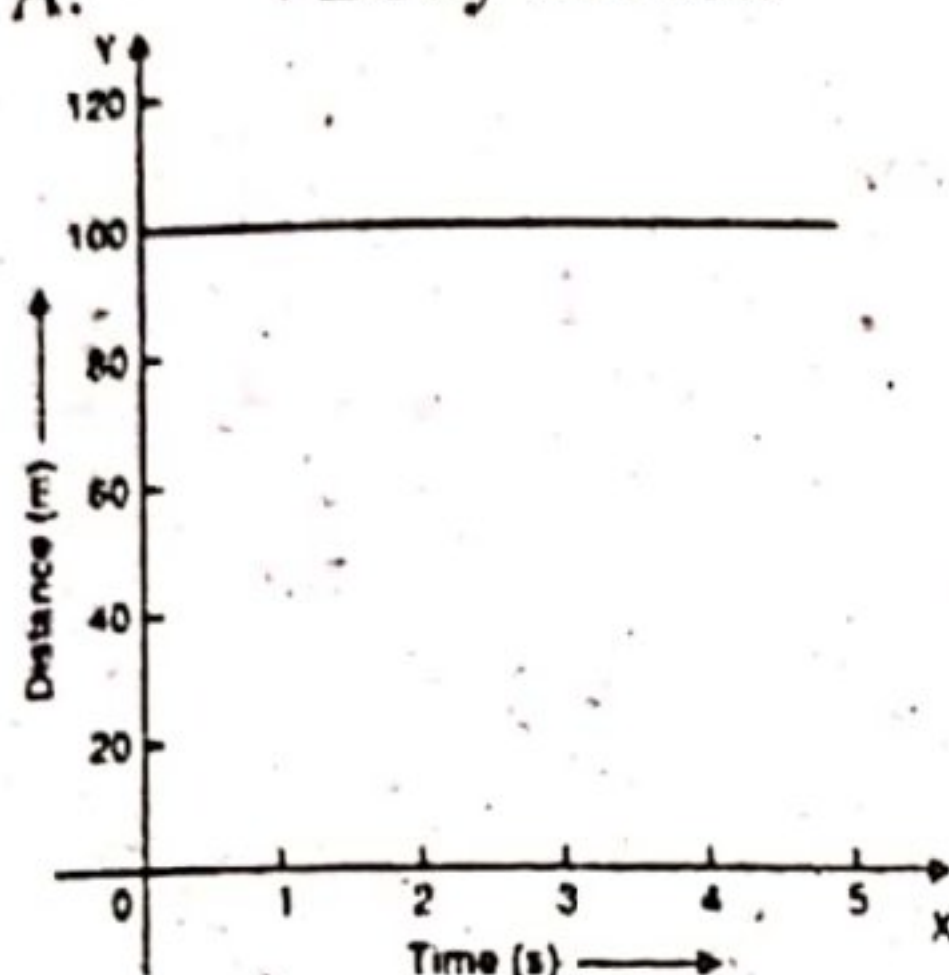




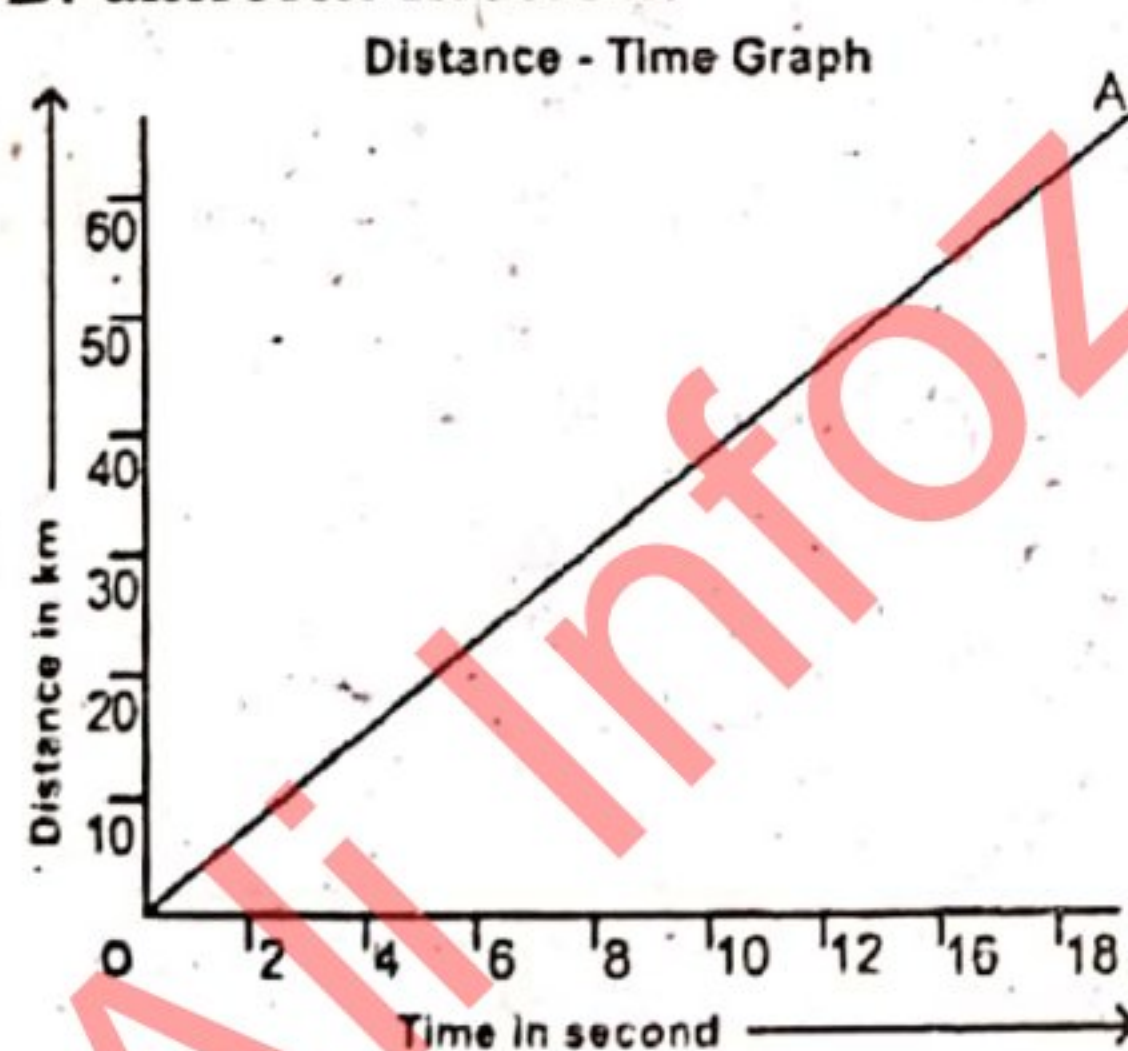
Answer:

a. From B to C is uniform motion.

A. Body at rest:



B. uniform motion:



**Q2. Define force and its unit. Give example explain different effects of force on the body.**

**Answer:**

**Force:**

Force is an agent that pull or push an object. In SI the unit of force is Newton (N). which is "if a body of mass 1 kg is push and its speed is increasing at rate of 1 m/s each second then force applied on it has value of 1N."

**Different effects of force on a body:**

b. From B to D is representing increasing speed.

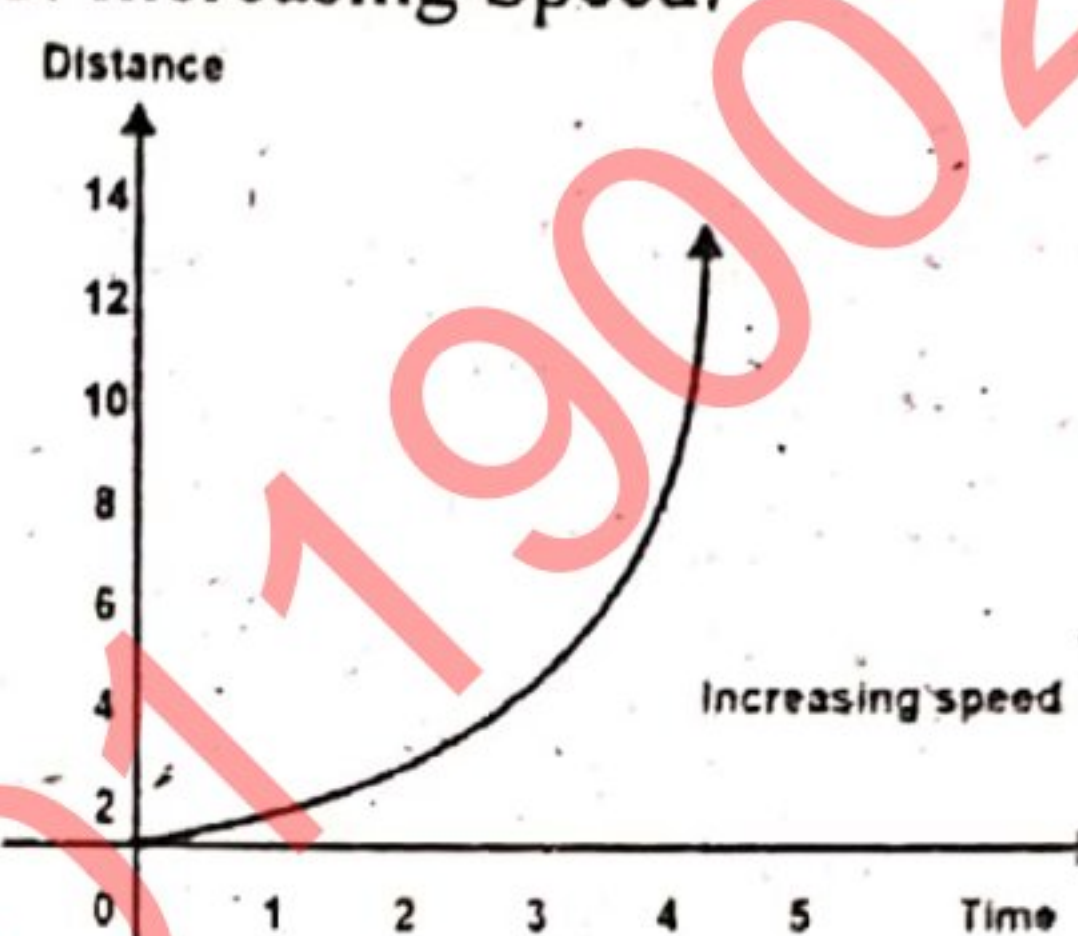
c. From A to B the body is at rest.

**D. Long Questions**

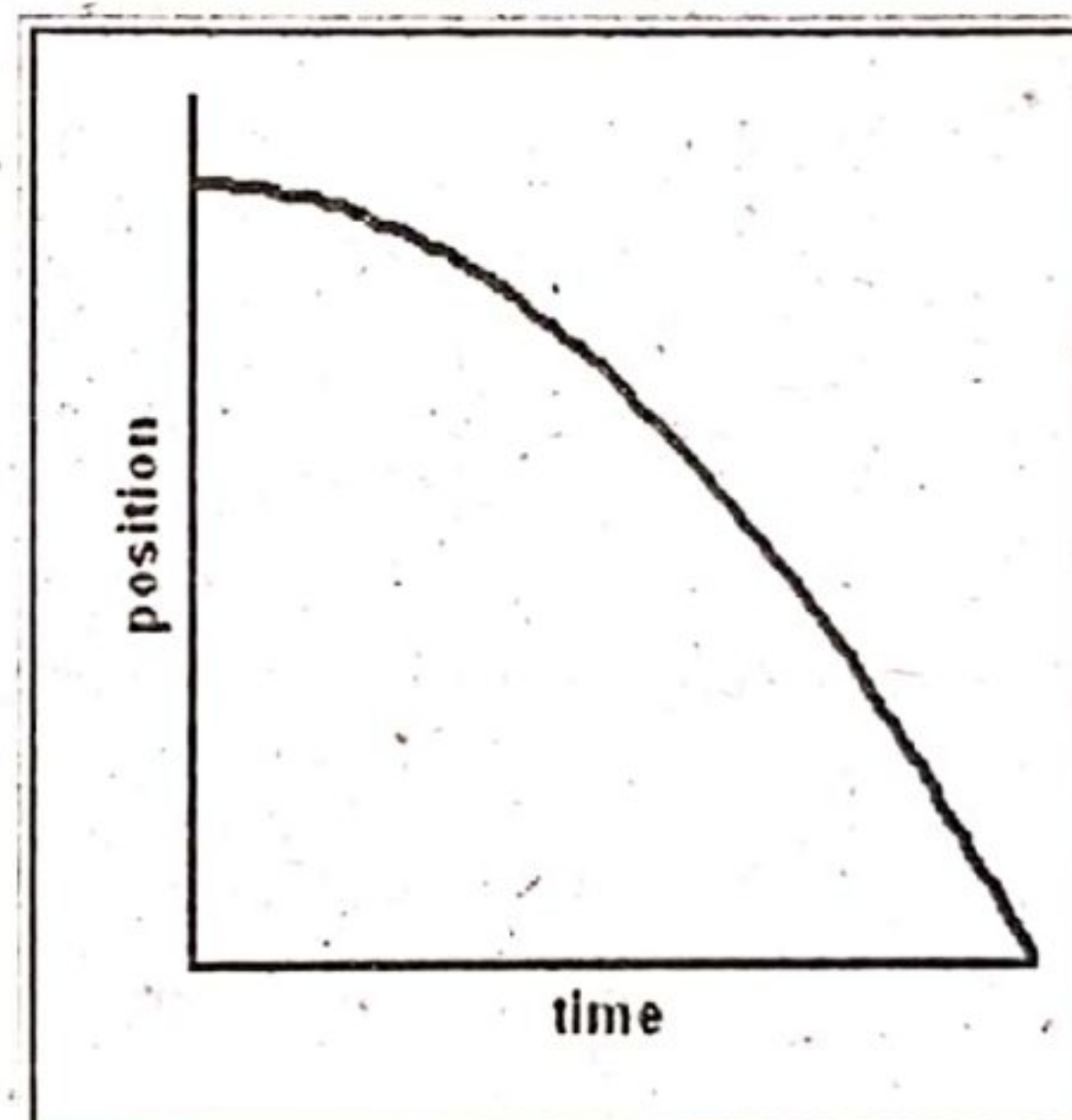
**Q1 Draw distance time graphof:**

- body at rest
- uniform motion
- moving increasing speed
- moving decreasing speed

**C. Increasing Speed:**



**D. Decreasing speed:**



Force can change state of the body; Rest body can be brought to motion moving object can be both to rest.

It can speed up or slow down the moving object. It can also change the direction of motion of a body.

**Q3 With the help of example show that force acts in pair.**

**Answer:**

If we threw the ball against the wall, the force of the ball applies on the wall is action. After striking the wall, ball comes



back due to the force exerted by the wall on the ball is reaction.

Thus action and reaction is always acting in pair.

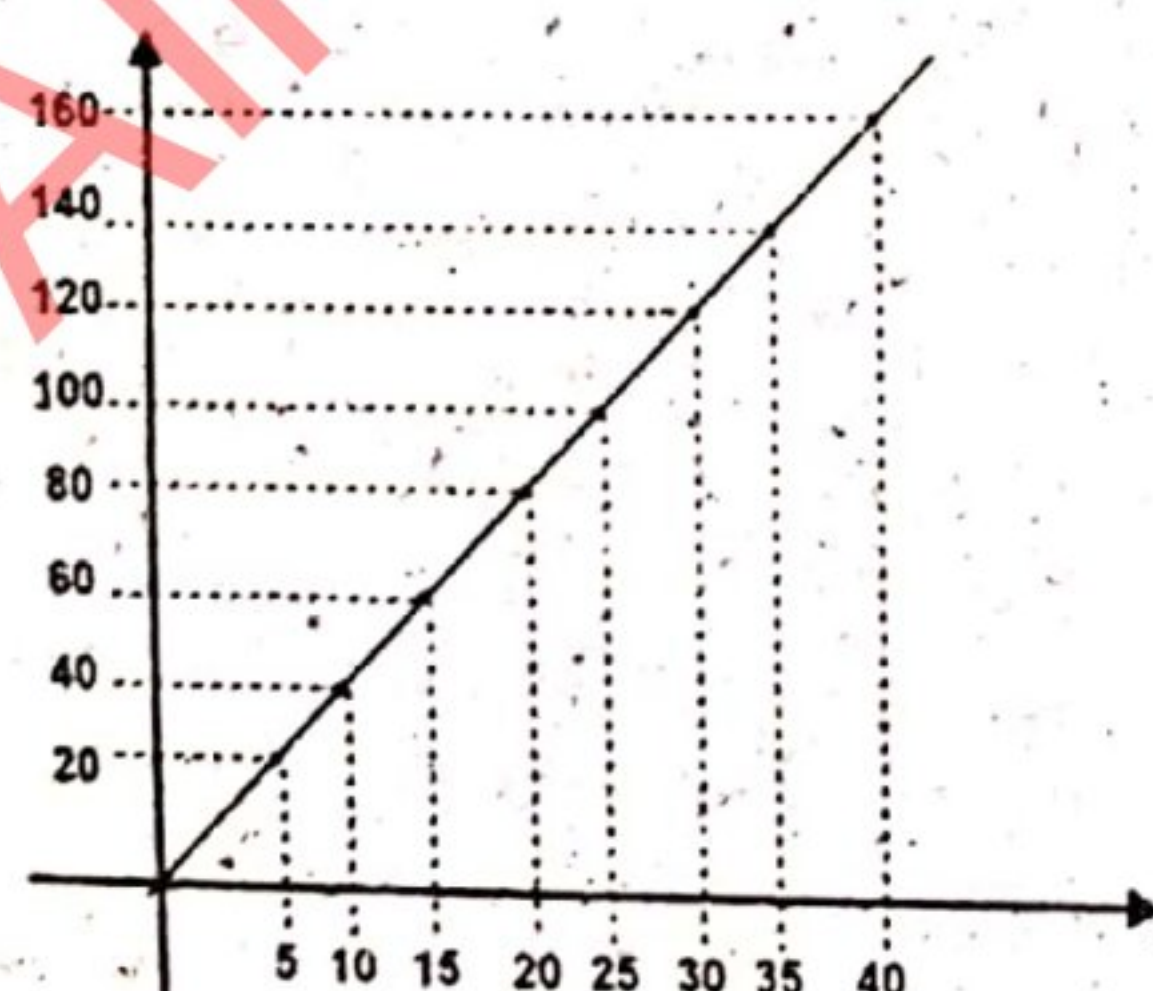
Similarly walking on the ground. To walk on the ground, we push the ground backwards as action, and ground pushes us in forward direction due to reaction. Similarly flying birds, rowing boats etc acts in pairs.

### E. Structured Questions

Q:1 A car is traveling on the highway. distance and time is recorded at different interval of time (see table).

Time seconds	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:



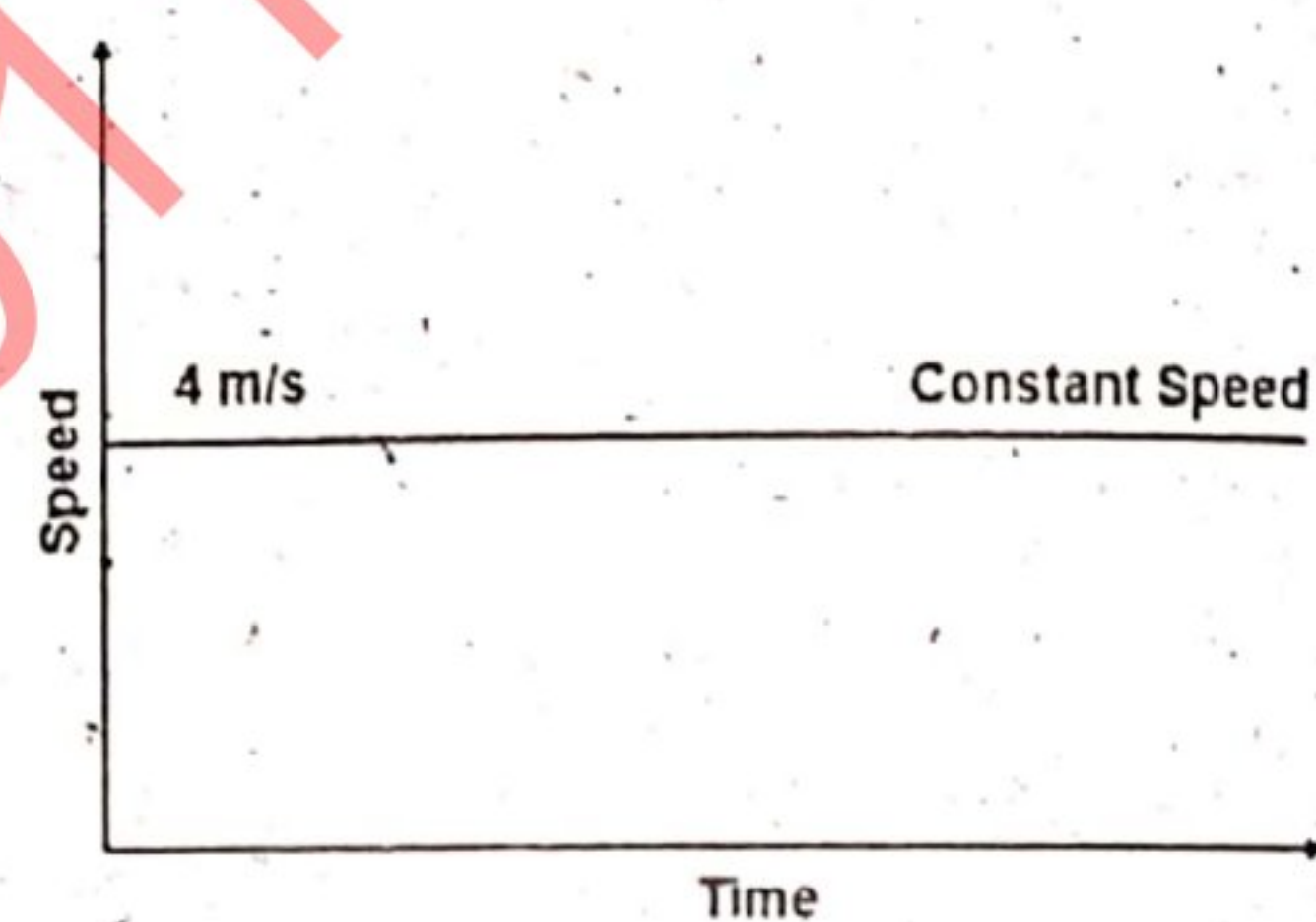
B. Tell whether it has uniform speed, increase, or decreasing speed give reason of your selection.

Answer:

As the car covers equal distance in equal intervals of time. so this speed is called uniform speed.

C. Draw the speed time graph.

Time seconds	0	5	10	15	20	25	30	35	40
Distance meter	0	20	40	60	80	100	120	140	160
Speed m/s	0	4	4	4	4	4	4	4	4

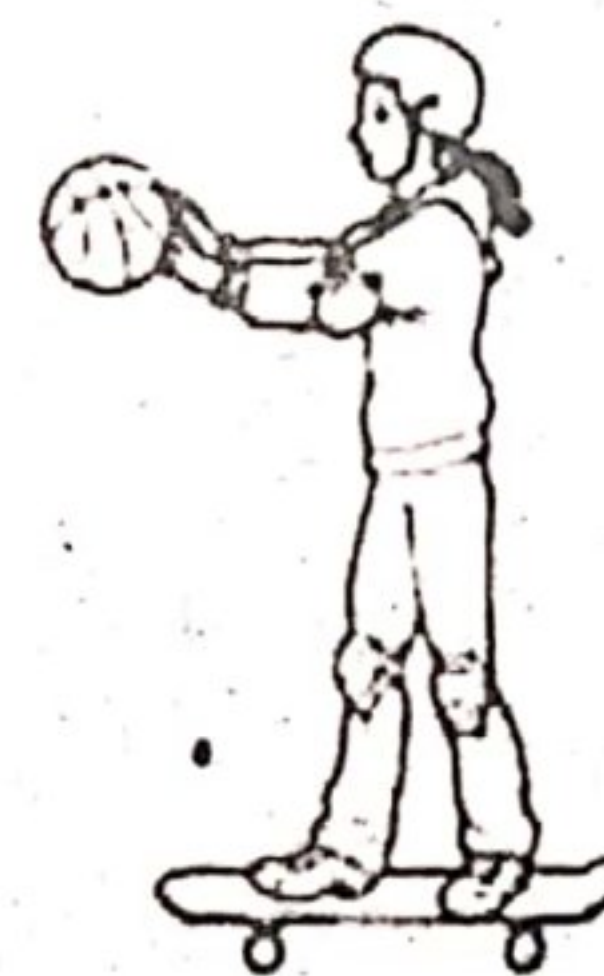


Body is moving in constant speed.

2. A boy is standing on the skateboard skating field and throwing the ball as shown.



Initial



final

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

Ans: Yes, if there is no friction the man will move but he will remain in motion and cannot stop.



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

Ans: The boy moves in opposite direction of the ball because of action and reaction.

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

Ans:

The ice skating golf is another similar example.

## Units 9

### Waves and Energy

Words	Meaning	Words	Meaning
Waves	لہریں	Trough	نشیب
Energy	توانائی	back and forth	آگے پیچھے
Disturbance	خلل	Compression	دباؤ
Vibration	تھر تھراہٹ	Rerefaction	کھولنا
Medium	واسطہ	Density	کثافت
Transfer	ترسیل، منتقلی	Wavelength	طول موج
Matter	مادہ	Consecutive	لگاتار
Pebble	پتھر	Amplitude	دھڑ
Pond	تالاب	Frequency	تقد
Up and down	اوپر اور نیچے	time period	دورانی وقت
Mechanical waves	میکانی لہریں	Relationship	رشتہ
Electromagnetic wave	برقناطیسی لہر	Shrill	باریک آواز
Sound	آواز	Grave sound	شدید آواز
seismic waves	زلزلہ کی لہریں	Distinguish	فرق
Vacuum	خلاء	Sensation	احساس
Continuously	مسل	loud sound	بلند آواز
Characteristics	خصوصیات	directly proportional	راستہ تناسب
transverse waves	عرضی موجیں	Area	رقبہ
longitudinal waves	طولی موجیں	Sensitivity	حساسیت
Crest	فراز	Echo	بازگشت / گونج
lightning	چمک	Thunder	گرج



## Exercise

## A. MCQs (Choose the best option).

1. Hertz (Hz) is unit of:

- a) Mass
- b) Energy
- c) Loudness
- d) Frequency

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

- a) 71m
- b) 17m
- c) 17cm
- d) 0.17m

3. Which of the following is a longitudinal wave?

- a. X-rays
- b. sand 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 3 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 doubled but amplitude of this sound wave is kept constant, then:

- a. loudness and pitch both increases

b. loudness and pitch both decreases

c. loudness increases and pitch remains same

d. loudness remain 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 a wave 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.  
**False.**

Ans: Waves transfer energy from one point to another. But not matter.

2. Sound is a form of energy that travels through a medium as transverse wave.  
**False.**

Ans: Sound is a form of energy that travels through medium as longitudinal wave.

3. High pitch sound means grave sound.  
**False.**

Ans: High pitch sound means shrill sound.

4. If you are standing near a loudspeaker then you hear a sound wave of large amplitude. **False.**

Ans: If you are standing near a loudspeaker then you hear loud sound.

- 5: Red light has greater speed in air then speed of sound in steel. **True.**

## C. Short Questions



1. Give at least two difference between mechanical waves and electromagnetic waves.

**Ans: Mechanical waves:**

Waves which can only travel through a medium are called mechanical waves. Mechanical waves cannot pass through vacuum. Its speed is different in different medium.

For example sound waves, water waves, etc.

**Electromagnetic waves:**

Waves which can pass through vacuum as well as through medium. It travel with a speed which is equal to the speed of light i.e (300000 km/s)

For example: light, X-Ray, or r-rays etc.

- Q2: Differentiate between transverse waves and longitudinal waves. give at least one similarity and one difference.**

**Ans: Transverse waves:**

These are such ways in which particles of the medium vibrate perpendicular to the direction of wave travel.

For example string waves, water waves etc.

It consists of crests and troughs.

**Longitudinal waves:**

These are such ways in which particles of the medium vibrate parallel to the direction of wave travel.

For example spring waves sound waves etc.

It consists of compression and rarefaction. Both are waves.

- Q3 Why do not we hear sound caused by explosion on the sun?**

**Ans:** As we know that there is a vacuum between sun and earth. And sound cannot travel through vacuum so we cannot hear sound caused by explosions on the sun.

- Q4 Define the following terms.**

**Crest:**

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

**Trough:**

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

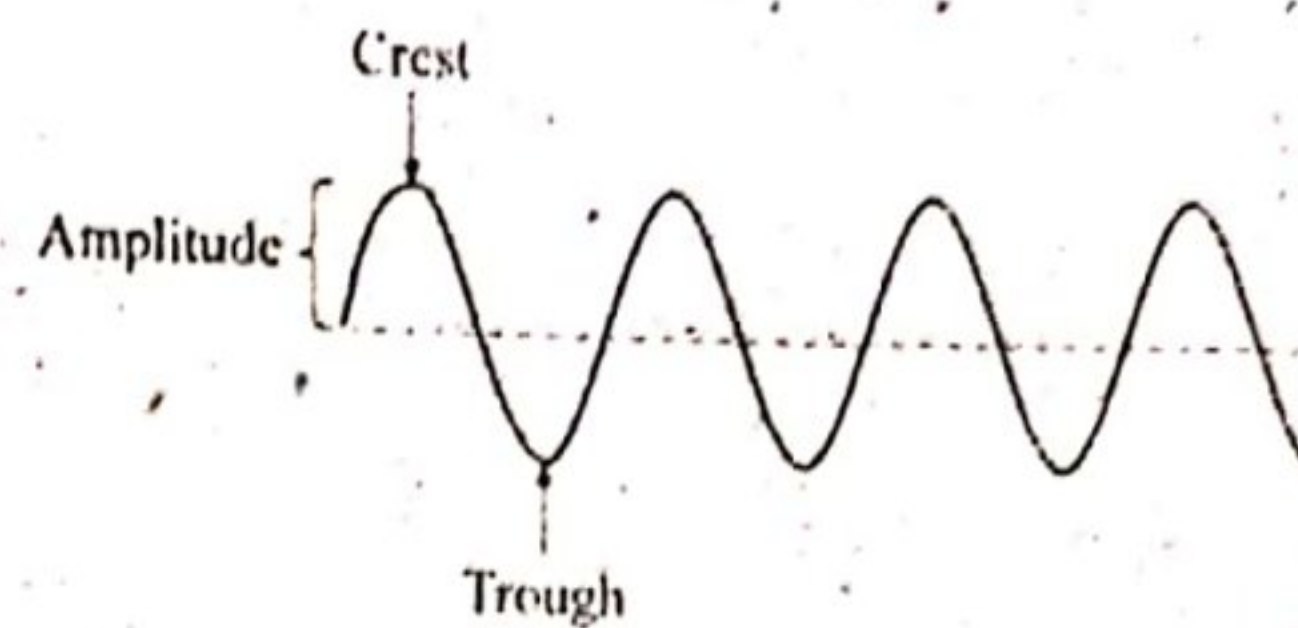


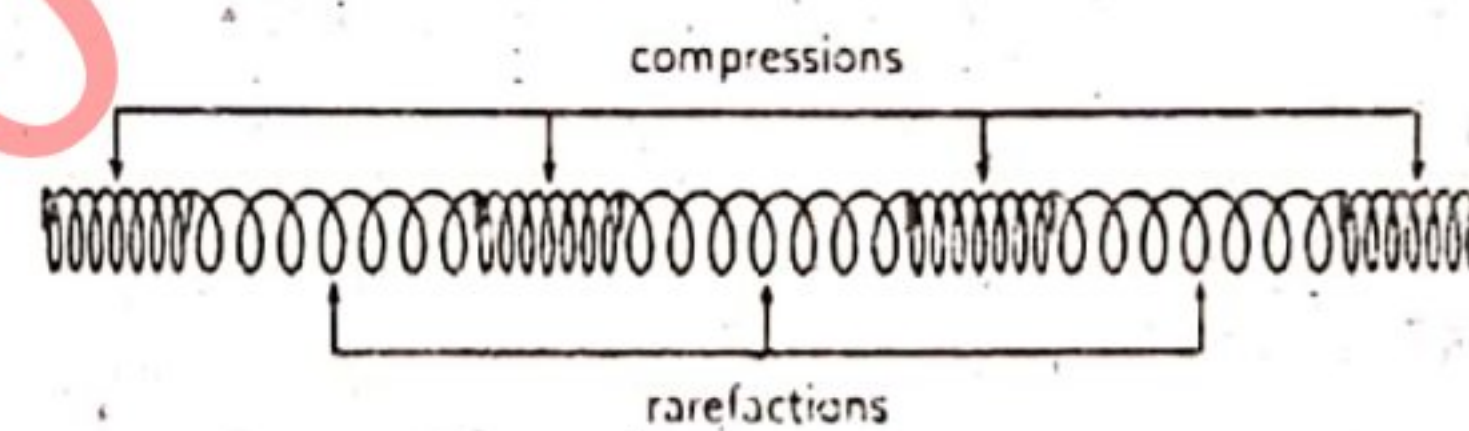
Figure 1

The mean level is the middle dotted line.

**Compression:** It is the region of longitudinal waves of low volume, high density and high pressure.

**Rarefaction:**

It is the region of longitudinal waves of large volume, low density and low pressure.



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

**Given data:**

Number of waves =  $n = 100$

Time =  $t = 20s$

**Required data:**

Frequency =  $f = ?$

Time period =  $T = ?$

**Solution:**

As frequency =  $\frac{\text{Number of waves}}{\text{time}}$

$$f = 100/20$$

$$f = 5 \text{ Hz}$$

And

$$T = 1/f$$

$$T = 1/5$$

$$T = 0.2 \text{ s}$$



**Q6** Waves are produced in a stretched string continuously. A wave passes through a point in 1.5 seconds, what is the frequency of waves?

**Given Data:**

Time periods =  $T = 1.5$  sec,

**Required:**

Frequency =  $f = ?$

**Solution:**

As Frequency =  $\frac{1}{\text{Time period}}$

$$f = \frac{1}{T}$$

$$f = \frac{1}{1.5}$$

$$f = 0.667 \text{ Hz}$$

**Q 7. How can a body produce sound? Explain briefly.**

**Answer**

**Sound:**

Sound waves are longitudinal waves which can be produced by a vibrating bodies.

A medium must be required for propagation of sound.

When we beat the drum plank the string of the guitar or hit anything sound is produced.

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

**Answer:**

**Pitch:** pitch of sound tells us how shrill or Grave sound is.

Sound produced by children, girls, whistling etc are of high pitch. While sound produced by men, dog, lions, etc are of low pitch.

Pitch of sound is directly proportional to the frequency i.e.  $\text{pitch of sound} \propto \text{Frequency of sound}$ .

**Q9. What is the loudness of sound name the factors on which loudness of sound depends.**

**Answer**

**Loudness of sound:**

The property of sound by which we can distinguish between a soft sound and a loud sound is called loudness of sound.

Loudness depends on:

- amplitude of vibration
- surface area of sound source.
- distance from sound source.
- sensitivity of ear.

**Q10. Mobile phone is vibrating in your hand and another mobile is vibrating on table. Which will be producing loudest sound and why?**

**Answer**

Sound produced by a vibrating mobile in our hand produces a louder sound as compared to the other. Because the separation is small.

**Q11 How can you hear echo?**

**Answer**

Echo is the repetition of sound due to reflection of sound wave from a hard surface back to the producer.

The time gap between the original sound and echo sound be at least 0.1 second.

While the minimum distance between the producer and reflecting surface should be at least 17m.

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

**Answer**

We hear the sound of the bat slightly after the bat hit the ball. Because the sound takes a little time to reach the person.

**Long Questions:**

**Q4. Define the following terms of waves.**

**Crest:**

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

**Trough:**

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



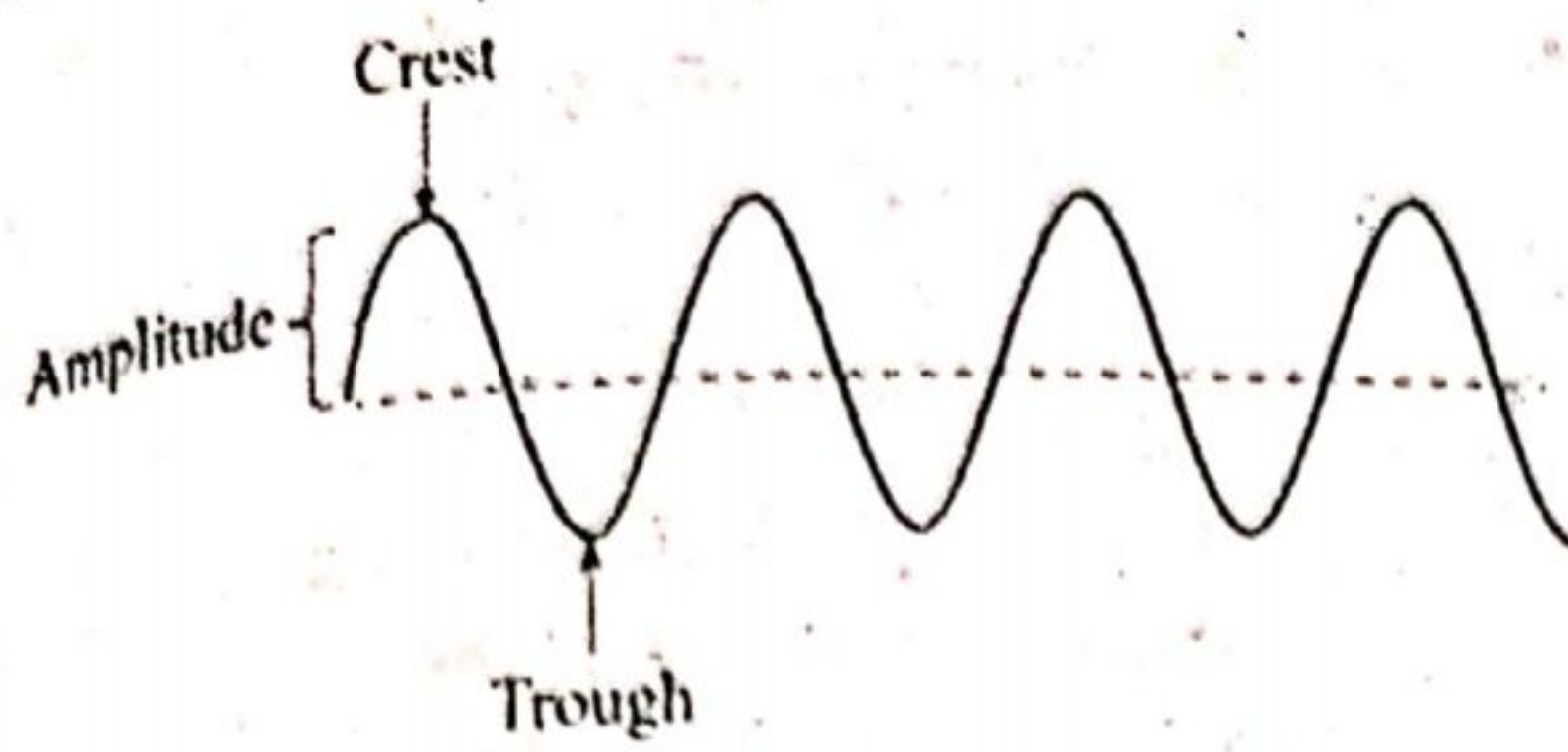


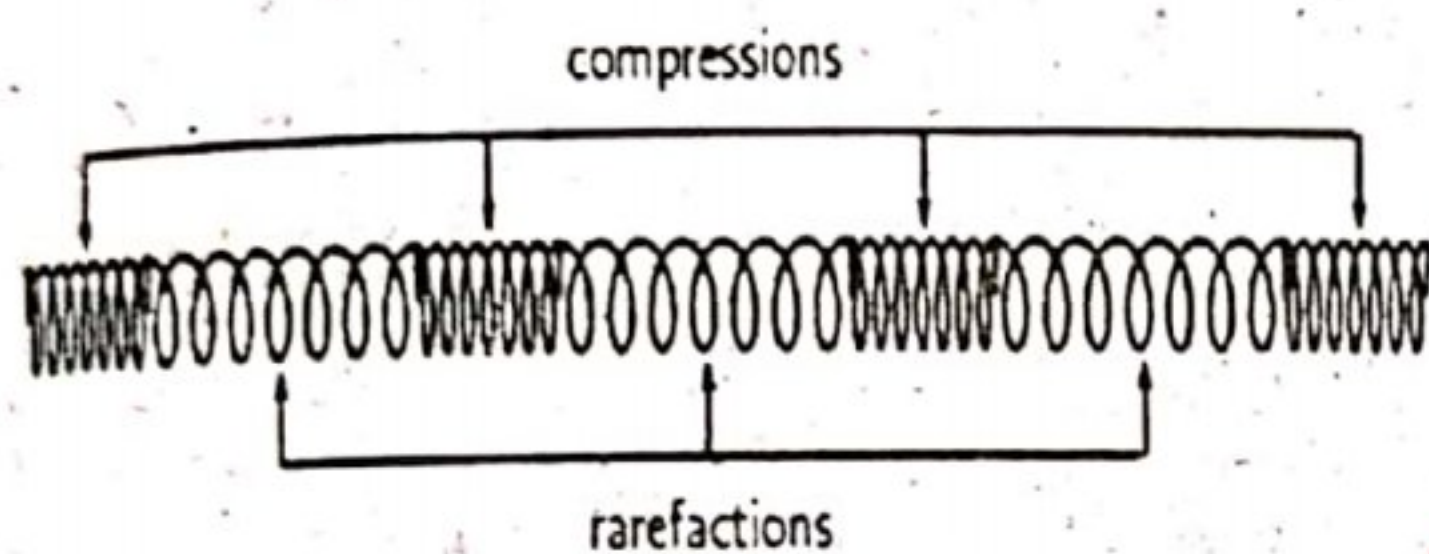
Figure 1

The mean level is the middle dotted line.

**Compression:** It is the region of longitudinal waves of low volume, high density and high pressure.

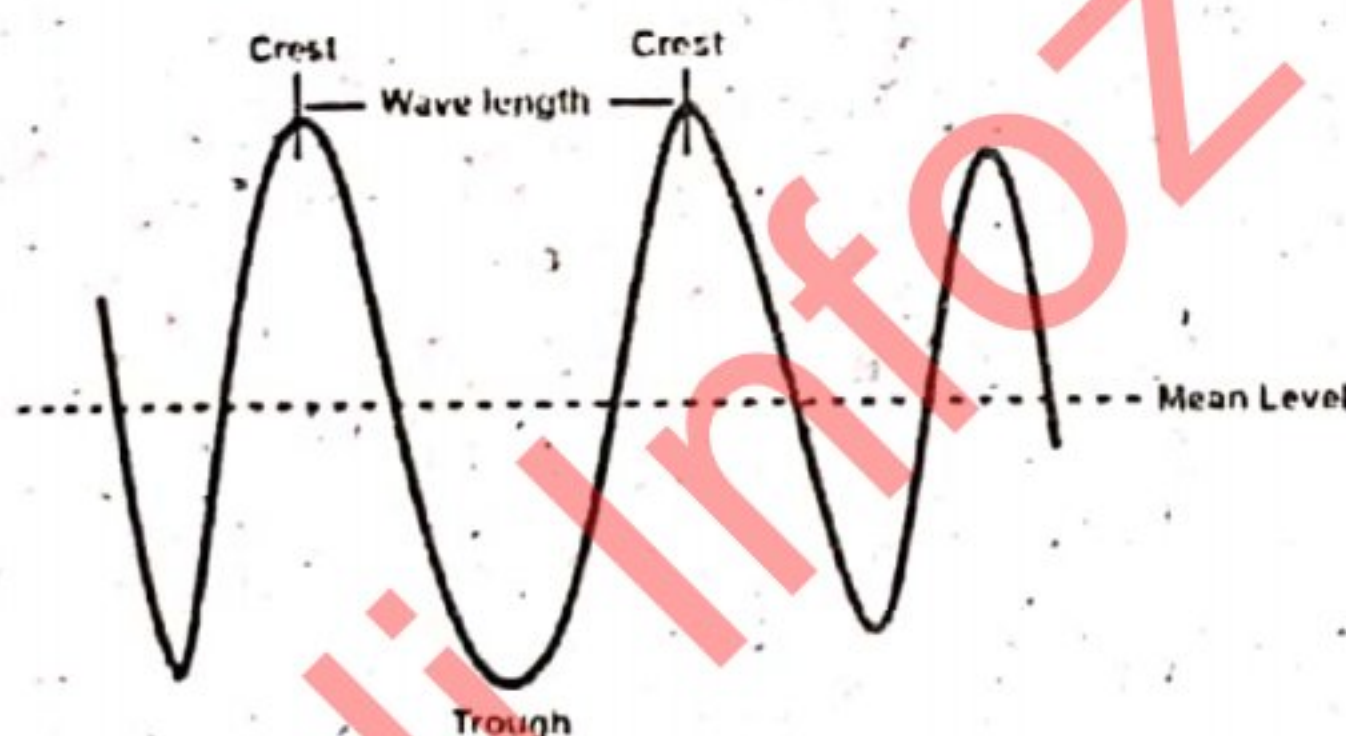
**Rarefaction:**

It is the region of longitudinal waves of large volume, low density and low pressure.



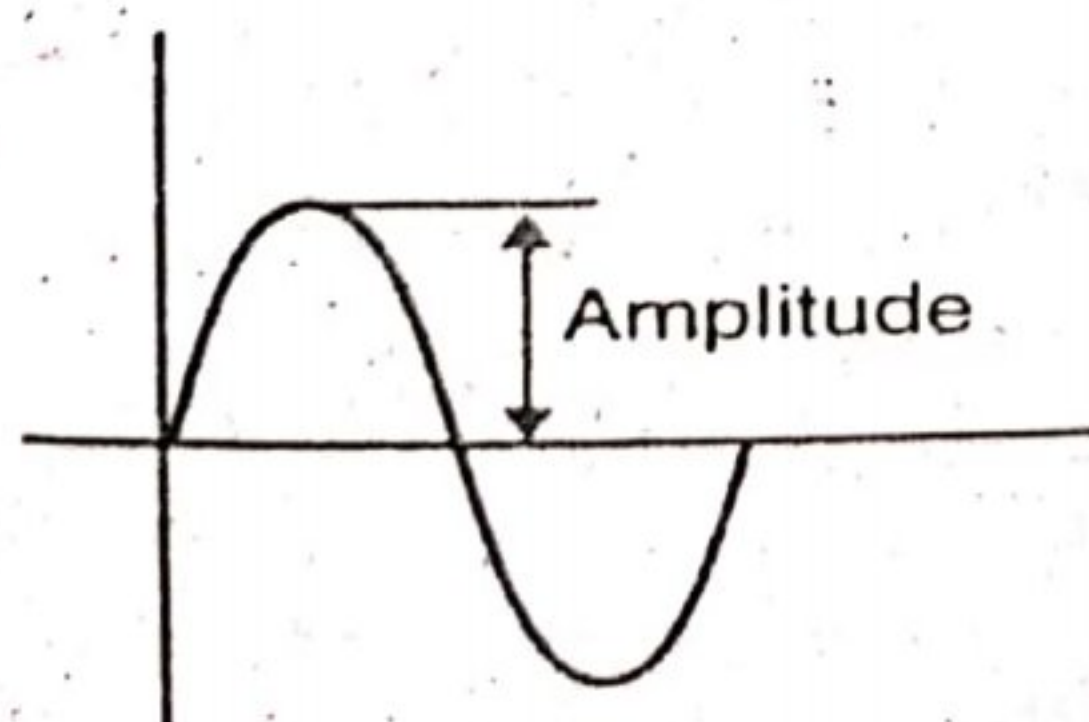
**Wavelength:**

The distance between two consecutive crests or trough is called wavelength.



**Amplitude:**

It is the maximum displacement of vibrating particles from the mean level.



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

**Answer**

As we know that :

Frequency ( $f$ ) = Number of waves/ Time Taken

$$f = n/t$$

And time period = time taken/number of waves

$$T = t/n$$

Multiplying both:

$$f \times T = (n/t) (t/n)$$

$$f T = 1$$

$$f = 1/T$$

**Q3. What is pitch of sound question mark on what factors it depends?**

**Answer**

**Pitch of sound**

"Pitch of sound tells us how shrill or grave sound is" It only depends on the frequency of sound. Greater frequency larger will be the pitch, smaller frequency less will be the pitch.

i.e. pitch of sound  $\propto$  Frequency of sound  
sound of children, girls, cat and whistling have high pitch, while the sound of dogs, man, lion etc have less pitch.

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

**Answer**

**Loudness:**

The property of sound which helps us to distinguish between a soft sound and louder sound is called loudness.

It depends upon the following factors.

**a. Amplitude of wave:**

Greater the amplitude of sound waves large will be the loudness and smaller the amplitude of sound waves smaller will be the loudness.

**b. Surface area of the source:**

Larger the surface area of the source larger will be the loudness and smaller the surface area of the source smaller will be the loudness.

**Distance from sound source:**

Greater the separation from the sound source lesser will be the loudness and Lesser the separation from the sound source greater will be the loudness.

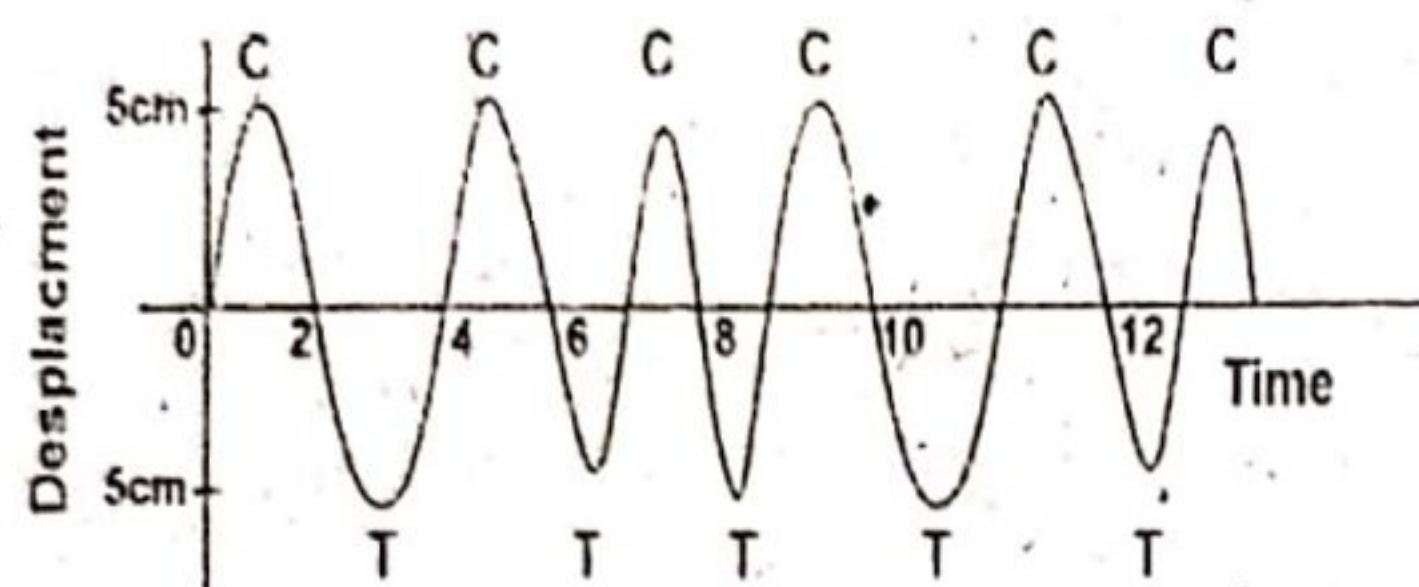
**Sensitivity of ear:**



Greater sensitivity of ear, largest will be the loudness and smaller the sensitivity of ear lesser will be the loudness.

### Structured Questions:

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



- a. How many Crest and Troughs are there?

Ans: There are 4 crest 3 troughs.

- b. What is amplitude of the wave?

Ans: 5cm

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

Ans: At 4 seconds the wave covers a displacement = one wavelength.

at 11 seconds the displacement =  $2\frac{3}{4}$  wavelength or 2.7 Wavelength.

- d. How many waves are there?

3 ( $\frac{1}{2}$ ) waves or 3.5 wave.

- e. What is time period of water waves?

$T = 4$  seconds.

- f. What is frequency of wave?

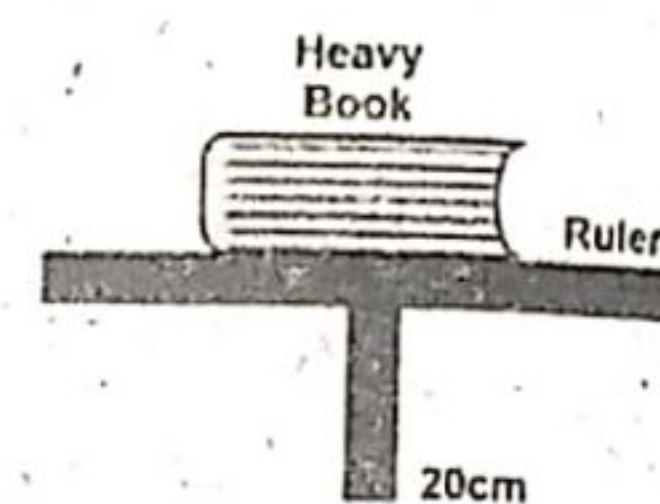
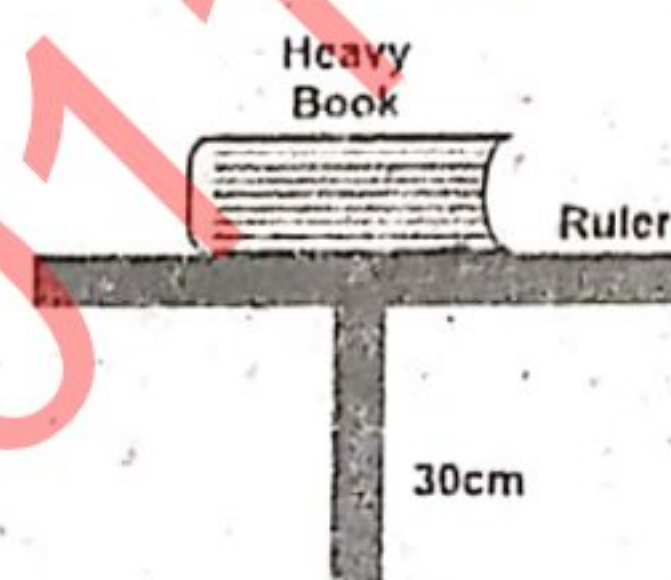
Ans:  $f = n/t = 3.5/14 = 0.25\text{Hz}$  or  $f = 1/T = \frac{1}{4} = 0.25\text{Hz}$

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

Ans: Wavelength = distance covered by wave/ number of waves

wavelength =  $7\text{m}/3.5 = 2\text{m}$

2. Consider the diagram, one end of each ruler is made fixed by placing under heavy books and there other end are free to vibrate. When the free end of each ruler is plucked with same force then: one ruler is 30 cm long, and the other ruler is 20 cm long.



- a. Which ruler will produce louder sound and why?

Ans: longer ruler (30cm) vibrates slowly, so has less frequency or (less shrill sound). Thus its loudness is maximum.

- b. Which ruler will produce sound of higher pitch?

Ans: ruler 20cm vibrates more quickly, so has a higher frequency or higher pitch.

## Unit 10

### Heat and Temperature

Words	Meaning	Words	Meaning
Heat	حرارت	Amplitude	جیتہ
Temperature	درجہ حرارت	Neighboring	پڑوسی
kinetic energy	حرکتی توانائی	Fluid	سیال
thermal energy	حرارتی توانائی	Expansion	پھیلاؤ



Average	اوسط	Contraction	سکڑاؤ
Thermometer	تھرما میٹر	Mercury	پارہ
Weather	موسم	Summer	موسم گرما
melting point	نقطہ پگھلاؤ	Buckling	خم دار
boiling point	نقطہ کھولاؤ	Bridge	پل
Conversion	تبدیلی	Damage	نقصان پہنچانا
Energy	توانائی	Transfer	ترسیل
hotter body	گرم جسم	Conduction	ایصال حرارت
cooler body	ٹھنڈا جسم	Convection	حمل حرارت
Absorb	مشاہدہ	Radiation	شعاع حرارت
Mathematician	ریاضی دان	Collide	ٹکڑا
Thermal	حرارتی	Conductor	موصل
Expansions	پھیلاؤ	Insulator	غیر موصل
Area	رقبہ	Metal	دھات
Volume	حجم	non metal	غیر دھاتی
Density	کثافت	Shining	چمک
Solid	ثبوت	Roof	چھت
liquid	مایع	Glazed	شیشے لگانا
reduce	کم کرنا		

**Exercise:****A. Choose the correct option.**

1. "J" Is the symbol of unit Joule, it is the unit of:
  - a. Temperature
  - b. Heat.
  - c. power.
  - d. Voltage.
2. If your class room temperature is  $27^{\circ}\text{C}$ , What is its value in kelvin scale?
  - a. 27 k
  - b. 373 k
  - c. 300k
  - d. 246k
3. Which of the following is the best conductor?
  - a. Wood
  - b. Water
  - c. Metal
  - d. Plastic
4. Which temperature of the following is representing melting point of ice?
  - a) 0k
  - b)  $32^{\circ}\text{C}$
  - c) 273k
  - 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 following is the worst conductor?
  - a) Metal
  - b) Wood
  - c) Wool
  - d) Air



7. Conduction of heat best takes place in

- a) solid
- b) Fluids
- c) Gases
- d) Vacuum

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

- a) Insulator
- b) Conductors
- c) Reflectors
- d) conventional devices

9. The heat transfer that occur due to density difference in fluid 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.

- 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 (total kinetic energy) and temperature (average kinetic energy of molecules) are two different things.
2. Only radiations can pass through vacuum. **True.**
3. On heating, solids expand more than liquids. **False**  
On heating, liquid extend more than solids.
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 he cannot enter from outside to room. **False**  
In double glazed windows. Heat can nither in or out from the room.

#### Short Questions

1. Define the terms thermal energy, temperature and heat write their SI units.

**Answer:**

**Thermal energy:**

The total kinetic energy and potential energy of all the particles in a substance is called thermal energy its unit is Joule.

**Temperature:**

The average kinetic energy of all the particles in a substance is called temperature.

Its unit is (K) kelvin.

**Heat:**

The total kinetic energy of all the molecules of a substance is called heat. Its SI unit is joule J.

**Q2:** temperature of hot iron rod is 1000 degree centigrade. convert This temperature into Kelvin and degree fahrenheit.

**Answer :**

$$\text{Temperature} = T(^{\circ}\text{C}) = 1000^{\circ}\text{C}$$

$$\text{As } T(^{\circ}\text{K}) = T(^{\circ}\text{C}) + 273$$

$$T(^{\circ}\text{K}) = 1000 + 273$$

$$T(^{\circ}\text{K}) = 1273^{\circ}\text{K}$$

Also,

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

$$T(^{\circ}\text{F}) = 1.8 \times (1000) + 32$$

$$T(^{\circ}\text{F}) = 1800 + 32$$

$$T(^{\circ}\text{F}) = 1832^{\circ}\text{F}.$$

**Q3. Why base of cooking utensils is made up of Steel but handle are made up of plastic?**

**Answer:**

The base of cooking utensil is made up of steel to conduct the heat easily. While the handle are made up of plastic. Thus the handle remains cool during cooking.

**Q4 If you put a centered Ping Pong ball in hot water, it part the proper shape how does it happen?**

**Answer**

The water will heat up the 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 engine. Give reason?**

**Answer:**

During day time, air near the Earth's surface becomes hot. So it expands and become lighter. This hot air rises. This upward moving air due to convection and is called thermal.

And this thermal helps glider to fly without any engine.

**Q6. Why do most material Become less dense as their temperature is increased?**

**Answer**

When most material- like fluid is heated, its particle starts moving with greater kinetic energy, push each other and hence it expands. This means that its volume increases.

As density = mass / volume.

Thus its density decreases with increase in temperature.

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

**Answer**

When the air in the room warm, its density decreases and rise up. The exhaust fan are connected near the ceiling to remove the hot air easily.

**Q8 Briefly explain the Expansion joints used in the bridges.**

**Answer**

The Expansion joints left in the bridges, due to this expansion joints, bridges can expand and contract easily during summer without any damage to bridge.

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

**Answer**

False ceiling below the roof is done with air trapped between ceiling and roof. Air being an insulator reduces flow from roof to room.

## D. Long Questions

**Q.1 Differentiate between heat and temperature on the basis of kinetic molecular theory?**

**Answer**

**Heat:** Heat is a form of energy that flows from hotter body to colder body. When a body absorb heat, the kinetic energy of the molecules increases. Thus according to Kinetic molecular theory the total kinetic energy of all the molecules of a substance is called heat. Its unit is joule J.

**Temperature:** Temperature is the measure of how hot or cold a body is:

According to the kinetic molecular theory the average kinetic energy of all the molecules of a substance is called temperature.

Its SI unit is (k) kelvin.

**Q.2 Solids are good conductors but gases are not. Explain in detail on the basis of kinetic molecular theory.**

**Answer**

According to Kinetic molecular theory solids have free electrons. When heat is given, these free electrons move fast and transfer energy to the other part of solid quickly thus solids are good conductor. on the other hand gases do not have any free electrons thus gases can not conduct heat.

**Q.3 What is conduction? how heat is transferred by conduction? why metals are good conductor of heat?**

**Answer**

**Conduction:**

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

In solids Its particles are very close to each other when one end of a metal rod is heated then its particle begin to vibrate more energetically. They collide with neighbouring particles and transfer its energy to the other particle and so on.



Metals are good heat conductor because it has large number of free electrons.

**Q.4** What is convection? How heat is transferred by convection?

**Answer**

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

Convection can take place in fluids.

When water is heated in the pot. Then water at the bottom of the pot receives heat, expands and rises up. This process continues and circulating the flow of water. This will warm the whole water in the Pot due to convection.

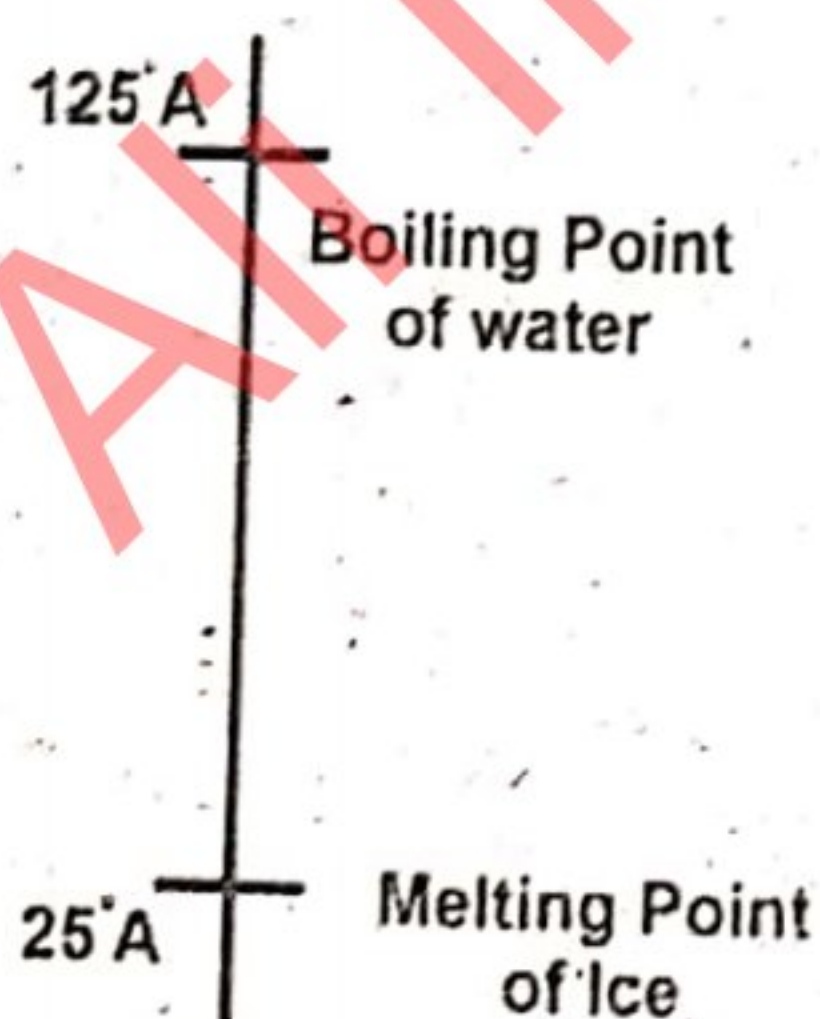
### Structured Questions.

**Q.1** You are asked to design a temperature scale. let's call it auto temperature scale with unit symbol "A". if melting point of ice on it is 25 degree A and boiling point of water is 25 degree A.

- Draw and label the diagram with value of lower and upper references point.
- Find the number of divisions on it. also draw on the scale.
- Which one is Greater, 1A or 1 k?

**Answer:**

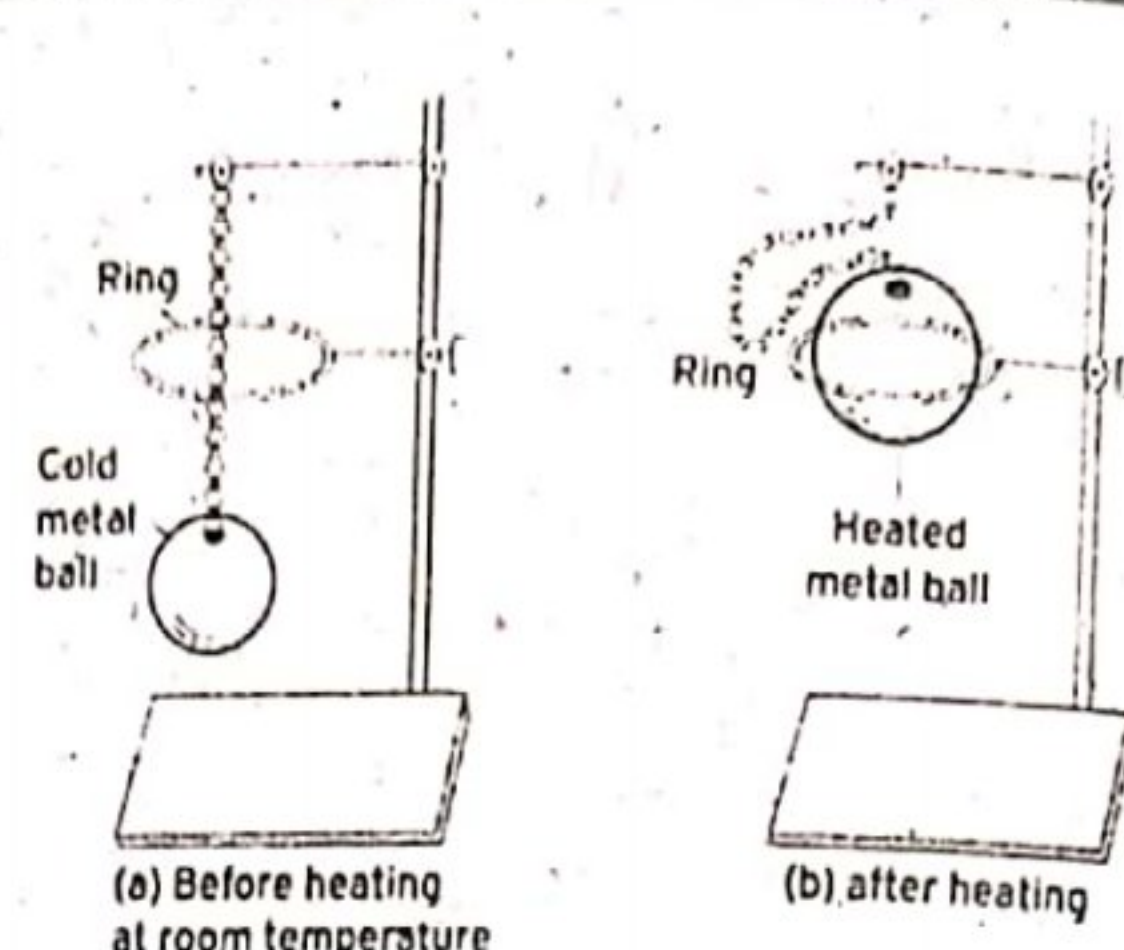
a.



B. Number of divisions =  $125 - 25 = 100$  divisions.

C. Kelvin is greater than, atto.

**Q.2** Consider the Apparatus shown in the figure, the metal ball can pass easily through the ring.

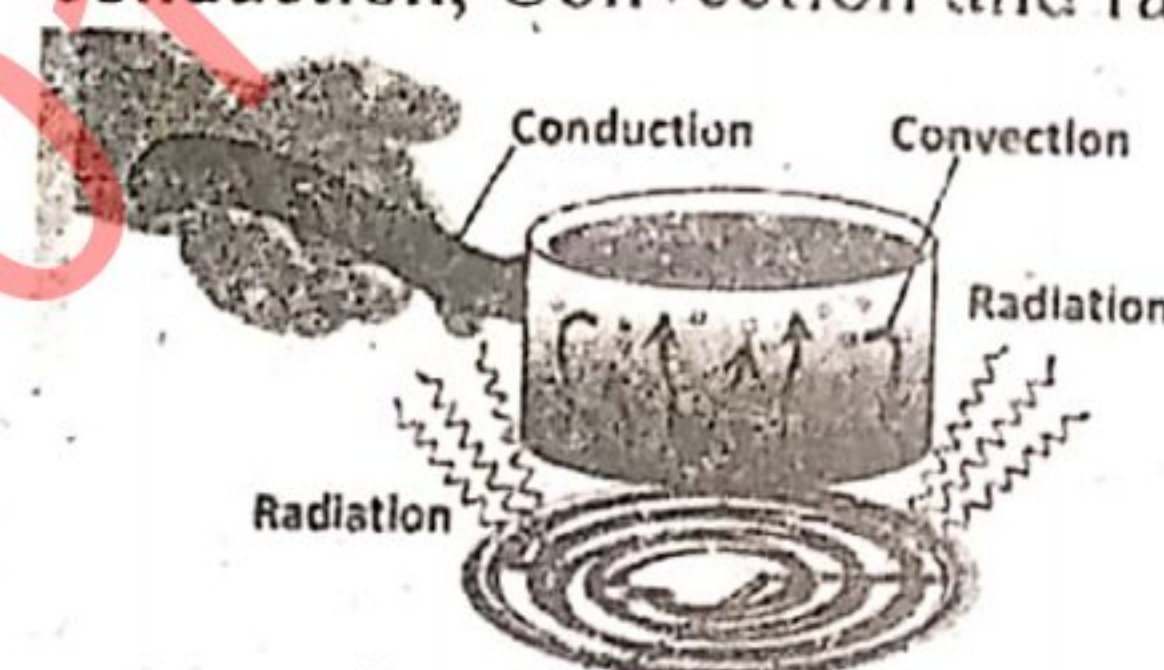


When metal ball is heated and we try to pass through the ring again, it will not pass. Why?

Ans: Because on heating the metal body expands.

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

a. identify which letter ABC is represented each of following process. conduction, Convection and radiation.



- Convection
- Conduction
- Radiation

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

Ans: Due to radiation.

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

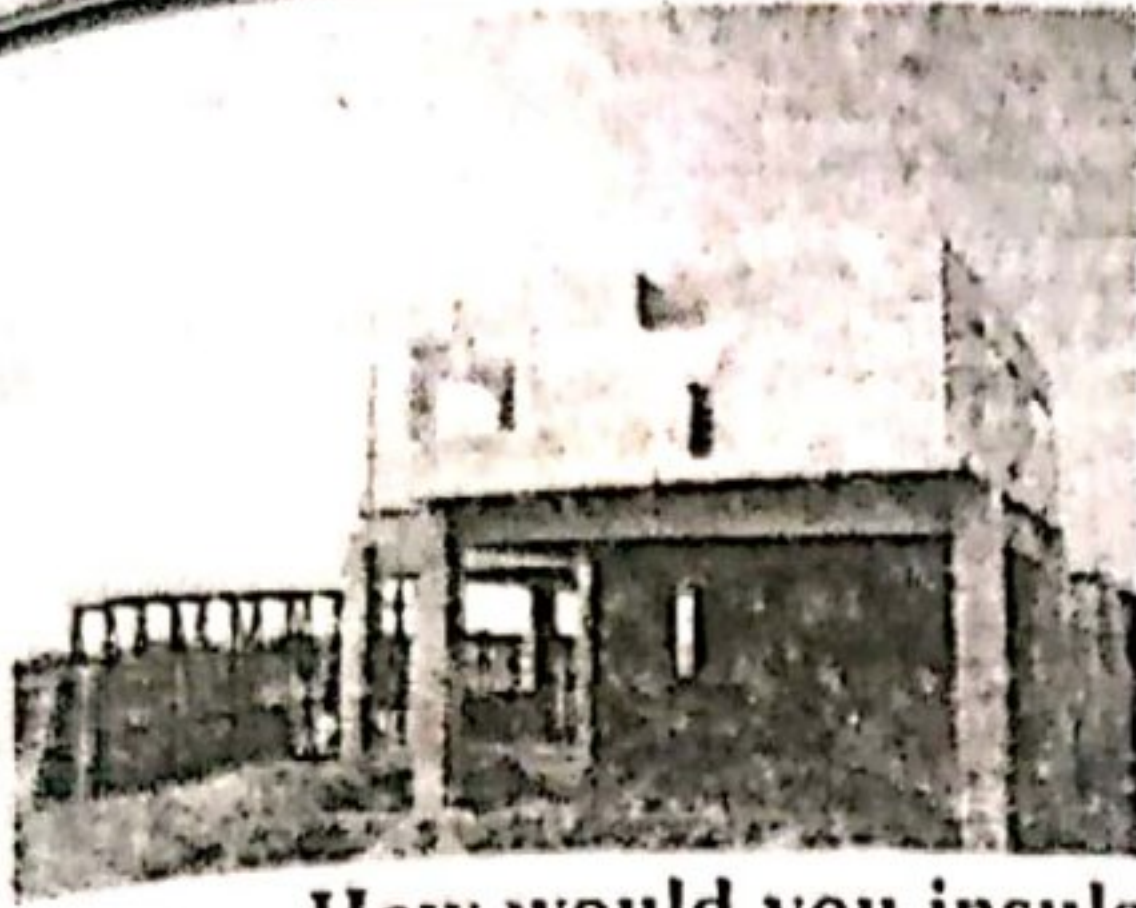
Ans: Due to convection.

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

Ans: Pot handle is made up of plastic which is an insulator. Which cannot conduct heat.

**Q.4** A building is shown in the figure. You want to thermally insulated it.





a. How would you insulate its rooftop?

Ans: False ceiling below the roof is done with air trapped between ceiling and roof. Air being good insulator reduces the heat flow from roof to room.

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

Ans: As air being good insulator reduces the heat flow from roof to room.

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

Ans: When the glass bottle is placed on hot plate, the water heated up and expands, thus the balloon is inflated.



## Unit 11

### Technology and everyday life:

Words	Meanings	Words	Meanings
Everyday life	روزمرہ کی زندگی	Drip	پھینکا
Conservation	بقا	Sprinkle	چھڑکاؤ
Technology	ٹیکنالوجی	Evaporation	بخارات
Wastage	بربادی (ضیاع)	Preservation	محفوظ کرنا
Distribution	تقسیم	Spoilage	خرابی
Shortag	کمی	Nomadic	خانہ بدوش
Agriculture	زراعت	Canning	گن بوتل
Industry	صنعت	Pasteurizing	برائیم ختم کرنا
Area	رقبہ	Freezing	جمنا
Scarcity	قلت	Drying	خشک کرنا
Consumer	صارف	Dehydrating	پانی کی کمی
Waste	فضلہ	Moisture	نمی
Irrigation	آبیاری	Legumes	دالیں
Desalination	ٹھیکینی ختم کرنا	Grains	اناج
Acid	تیزاب	Pickling	اچار
Patient	بیمار		



## Exercise

MCQs Choose the correct option.

1. The percentage of freshwater 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) to spread equally
  - b) reach the roots directly
  - c) sprinkles water
  - d) Evaporates
3. From the list is not a way to prove food:
  - a) Freezing
  - b) Pickling
  - c) Curing
  - d) Garnishing
4. The best way to preserve vegetable is
  - a) Salting
  - b) Drying
  - c) Curing
  - d) Tickling
5. The instrument used by doctors for listening heart beat 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) found plastic tube, balloon and duct tube
  - b) funnel and duck tube only
  - c) tubing the duck tube only
  - d) Balloon 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 save
  - d) keeping skin moisturized
8. a 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 salt
- 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) Drawing at a certain temperature to keep food microbe free
- d) Heating to change the colour of the food

## Long Questions:

What is preservation of food?

Describe any five ways in which food can be preserved.

Answer:

Preservation of food:

Ans: Preservation of food means preventing it from spoilage.

The way in which food can be prevented as:

a. Canning: The food is heated at a specific temperature for a certain time. Then vacuum sealed in special glass jars.

b. Freezing: The food can be freeze to use it for long time.

c. Drying: Drying is the process of dehydrating food.

d. Pickling: In pickling the food is soaked in a solution containing salt and acid.

e. Dry salting: This is an alternate method of Canning.

Q.2 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.

Answer

There are many areas in Pakistan where people do not have an access to



safe and clean water for their basic need. They have to travel for a long distance to reach water source. Therefore we should carefully use water in order to avoid any wastage. There are so many ways to conserve water, but a few of them are:

- a) Close taps properly
- b) Do not keep the tap running while washing.
- c) Take shower for little time
- d) Creating awareness among people about the need and ways to conserve water
- e) Collect the rain water and dams. etc.

**Q.3 Right making a stethoscope in the school.**

**Answer**

**Material:**

Two funnels, Plastic tube, to medium sized balloon, tap and scissor.

**Steps:**

- a) Attach the plastic tube to the funnel with the help of tab.
- b) Attach balloon to the upper and a funnel
- c) The funnel can be placed on the chest and on the ear
- d) our stethoscope is ready.

**Structured questions:**

1. Imagine you and your friends are going camping and 1 week at 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 and neutral requirements.
- b. Method of preservation used.
- c. Also mention the days it will be safe for consumption.

**Answer:**

A. For camping we need the following foods

- a) Dehydrated foods.
- b) Dry fruits, nuts,

- c) Sandwich making materials
- d) Water
- e) Powder milk
- f) Egg etc.

**B. Preservation method used for camping are:**

- a) Drying
- b) Canning
- c) Freezing

**C. After opening canned foods will last around 3 to 4 days.**

- a) Dried food ranges from 4 months to 1 year.
- b) Freezing food ranges from many days.

**Q.2 Using the same technique you applied for making a shutter scope. make string telephone.**

- a. What is common in growth projects?
- b. Using the same technique. What else can you make?

**Answer:**

- a. 2 paper cup and a long piece of string.
  - b. pass a string through the hole in each cup.
- tie paper clip on the end of each string. Find a friend walk a part and talked through the inside of the cup.

**Q.3 You made my hand sanitizer?**

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

Ans: Washing hands with soap remove the germs from Hands while sanitizer kill all the germs on the skin.

- b. Make a poster for your hygiene

Ans: Make a poster self hygiene and cleanliness.



## Unit 12

## Earth and Space

Words	Meaning	Words	Meaning
Force	قوت	Constellation	ستاروں کی چھترمت
Gravity	کشش ثقل	Tilted	جھکا ہوا
Planets	سیارے	Perpendicular	عموداً
Attraction	کشش	Equinox	وہ زمانہ جب سورج استوا کو قطع کرتا ہے
Strong	مضبوط	Autumn	خزاں
Suddenly	اچانک	Summer	موسم گرما
centripetal force	مرکز مائل قوت	Annual	سالانہ
natural satellite	قدرتی سیارہ	Rotation	گردش
Mass	کمیت	Hemisphere	نصف کرہ
Weight	وزن	North	شمال
Quantity	مقدار	South	جنوبی
physical balance	طبعی ترازو	East	شرق
heavy objects	بھاری اشیاء	West	مغرب
Strength	طاقت	Revolution	چکر
Tides	مد و جزر	Season	موسم
Ocean	سمندر		

## A. MCQs choose the correct option

- SI unit of weight is
  - Newton
  - Kg
  - Metre per second
  - Pascal.
- If 20 kg mass is lifted from earth to moon, what is its mass on moon?
  - 20kg
  - 2 kg
  - 4kg
  - 3.2 kg
- If value of  $g$  is on a planet is 25 Newton per kg then what is weight of 2 kg body on it?
  - 25 N
  - 50 N
  - 75 N
  - 150 N
- If it is Spring in southern hemisphere of Earth then which weather is in Northern hemisphere?
  - Summer
  - Winter
  - Spring
  - Autumn
- Which of the following is involved in producing Tides in ocean?
  - Gravitational pull of moon on earth
  - gravitational pull of sun
  - rotation of earth
  - all of these



B. Write true or false. correct statement if it is false.

1. Weight is quantity of matter in a body.

False

Ans: Mass is the quantity of matter in a body.

2. Season on earth are related to spinning motion of Earth. **False**

Ans: Seasons on earth are related to the revolution of earth around the sun.

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

4. Tilt of Earth is about 23.5 degrees. **True.**

5. When it is summer in Northern hemisphere then it is Spring in Southern hemisphere. **False**

Ans: When it is summer in Northern hemisphere it will be winter in Southern hemisphere.

### C. Short Questions

1. Differentiate between mass and weight of a body.

Ans: **Mass:** The quantity of matter in an object is called mass.

Its unit is kg.

It is measured by ordinary balance.

**Weight:**

The force with which Earth attracts anything towards its Centre is called weight.

Its unit is Newton

It is measured by a spring balance.

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

Ans: As mass of the moon is 6 times less than mass of Earth. So gravitational field strength on the moon is six times less than that of Earth.

**Q.3** If mass of a body is 50 kg, then calculate its weight on Earth and Moon?

**Given data:**

Mass =  $m = 50\text{kg}$ ,

**Required:**

Weight on Earth =  $w = ?$

Weight on moon =  $w = ?$

**Solution:**

a. As weight =  $mg$

While  $g$  on earth

$g = 10\text{ N/kg}$

So,

$W = 50 \times 10$

$W = 500\text{ N}$

b.

$g$  on moon:  $= g = \frac{1}{6} (g \text{ on earth})$

$g = \text{moon} = \frac{1}{6} (10)$

$W (\text{moon}) = mg (\text{moon})$

$= 50 \times \frac{1}{6} \times 10$

$= 500/6$

$83.3\text{N}$

**Q.4 Define the terms**

a. **Axis of Earth:** Axis is the line around which Earth spins.

b. **Hemisphere:** Any circle drawn around Earth divides it into two equal halves called hemisphere.

c. **Equator;** and equator is an imaginary line around the middle of the planet. It is halfway between the north pole and south pole (at zero latitude).

**Q.5** What is constellation? Why does a constellation position change during a year?

Ans: **Constellation:** Constellation is a group of stars that appears to form a pattern or picture (like line, bull etc).

As the earth moves around the sun. So it observe the year. The constellations shift gradually to the west.

**Q.6** Briefly explain, how axial tilt is used in season change on earth?

Ans: Due to tilt of the earth, different parts of the earth receives maximum direct sun rays.

When the tilted axis of the earth is towards the sun the northern hemisphere receives most of direct sun ray. Thus it will be summer in northern hemisphere. While it will be winter in Southern hemisphere.



**Q.7** There was no axial tilt then there would have been no change in season on earth. Support or oppose this statement with reason.

**Ans:** If there was no axial tilt then there would have been no change in the season on earth because there would be minor variations in temperatures.

**Q.8** How does sun hold planets in their orbit?

**Ans:** The sun exerts a gravitational attraction force on other planets.

And this force acts like a centripetal force. Due to which the planets move around the sun in specific orbits.

**Q.9** If the gravity between Earth and Moon suddenly disappears. What will happen to moon which is revolving around the earth?

**Ans:** If the gravity between Earth and Moon suddenly disappears, then the moon will not be able to follow a circular path and would move in the straight line tangent to the orbit of the Moon.

### Long Question

**Q.1** How does gravity help to keep the planet in their orbits around sun?

**Ans:** Sun has huge mass, therefore it has strong gravity. As a result, the planets are affected by the sun's gravitational pull. This gravitational force is not strong enough to pull planets into the sun. However it is enough to move the planets around itself in their orbits.

**Q.2** Differentiate between mass and weight

**Answer**

Mass	Weight
1. The gravity of matter an object is called mass.	The force with which earth attracts anything towards its center is called weight.

2. The unit of mass is kilogram (kg)

The unit of weight is newton (N).

3. It is measured by ordinary balance.

It is measured by spring balance.

**Q.3** What is the axial tilt of the earth? Describe its role in the Earth day and night. What role does it play in the earth seasonal change?

**Ans:** The axial tilt:

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

Axial tilt of the Earth is 23.5 degree.

Earth's tilt axis causes the Seasons.

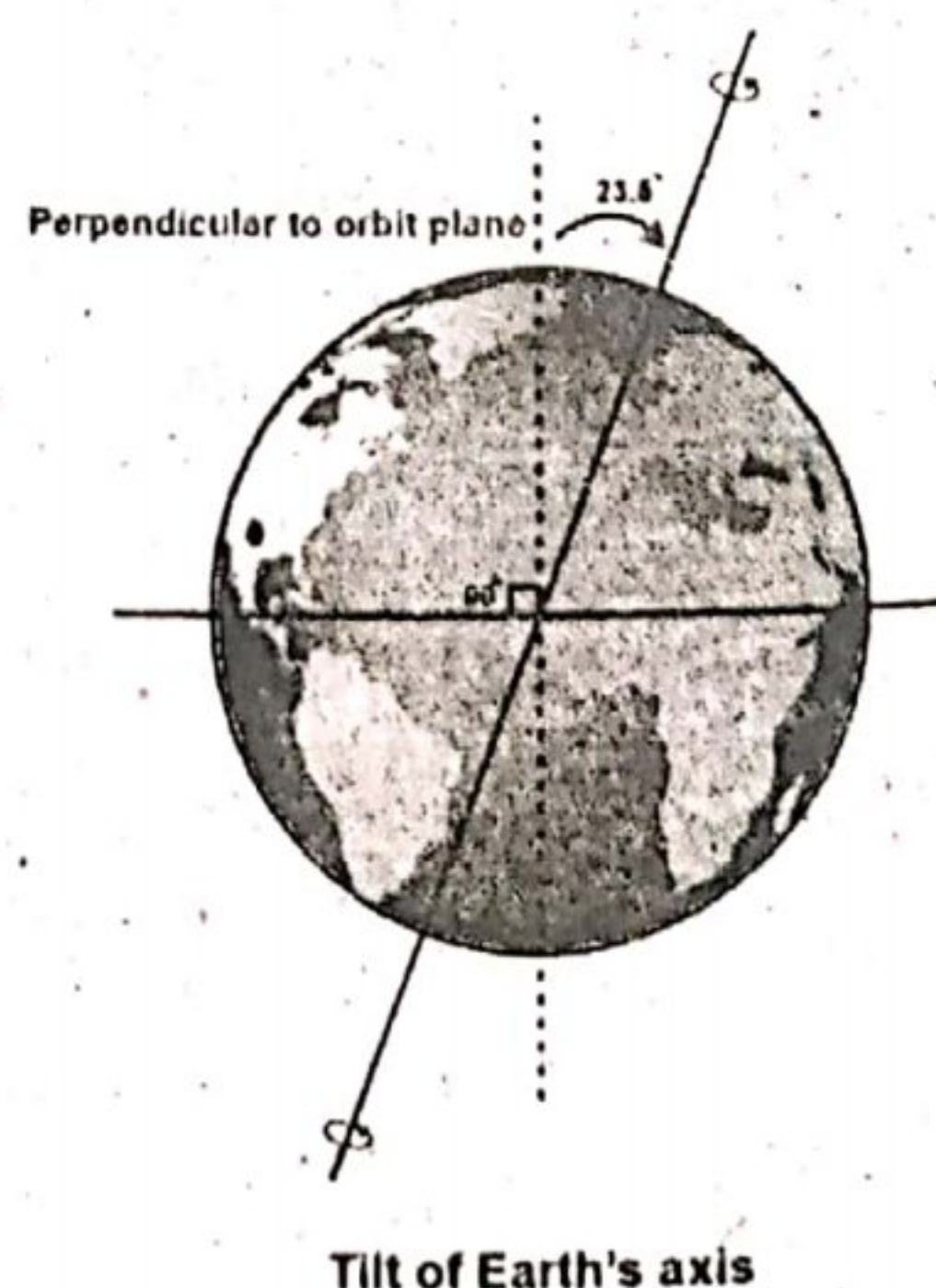
**Q.4** Describe how seasons in Earth's atmosphere are related to earth annual movement around the sun?

**Ans:** Due to tilt of the earth, different part of the earth receives maximum direct sun rays.

So, when the tilted axis of the Earth is towards the sun then Northern hemisphere receives most of direct sun rays. So it will be summer in northern hemisphere while it will be winter in Southern hemisphere.

### Structured Questions

1. Draw equator, axial tilt, showing axis of Earth, longitude and latitude of southern and northern hemisphere.





Q.2 Label the diagram with different seasons in Southern hemisphere.

