Ch -2

Physical and Chemical Change

A)Give example

a)examples of physical changes-Melting of ice into water

Freezing of water into ice

Boiling of water

Evaporation of water

Condensation of water vapour

Dissolving sugar in water

Dissolving salt in water

Cutting paper

Tearing a piece of cloth

Breaking a glass

b) Chemical Changes

Rusting of iron

Burning of wood

Burning of paper

Cooking food

Milk turning into curd

Digestion of food

Ripening of fruits

Formation of green coating on copper

Fermentation of sugar to produce alcohol

Baking a cake

c)Exothermic Changes (Heat is Released)-

Burning of wood

Burning of coal

Burning of LPG

Burning of a candle

Respiration in living organisms

Rusting of iron

Neutralisation of an acid with a base

Dissolution of quick lime in the water.

Explosion of fireworks

d) Endothermic Change-

Sublimation of camphor

Sublimation of ammonium chloride

Photosynthesis in plants

Cooking food

Baking bread or cake

Dissolving ammonium nitrate in water

Thermal decomposition of calcium carbonate

B)Give Reason

Give a reason why burning of a candle is both a physical and a chemical change.

Answer (Detailed):

Burning of a candle involves both a physical change and a chemical change.

Physical change: When the candle is lit, the heat of the flame melts the solid wax into liquid wax. The liquid wax can solidify again on cooling. Since no new substance is formed and the change is reversible, melting of wax is a physical change.

Chemical change: Some of the melted wax changes into wax vapour, which reacts with oxygen in the air and burns. During this process, new substances such as carbon dioxide and water vapour are formed, along with the release of heat and light. This change is irreversible,

so it is a chemical change.

2)Give a reason why burning of magnesium is a chemical change.

Burning of magnesium is a chemical change because magnesium reacts with oxygen present in the air to form a new substance called magnesium oxide (MgO). This new substance is a white ash with properties different from magnesium metal.

During the reaction, a bright white flame is produced and heat and light are released, showing that a chemical reaction has taken place. Since a new substance is formed and the change cannot be reversed easily, burning of magnesium is a chemical change.

Chemical equation:

2Mg+O2->2MgO

3.Heating of zinc oxide is a physical change. Give reason.

On heating, zinc oxide changes its colour from white to yellow.

On cooling, it changes back from yellow to white.

No new substance is formed during the change.

The change is reversible.

Therefore, heating of zinc oxide is a physical change.

4.Heating of lead oxide is a physical change. Give reason

On heating, lead oxide changes its colour (yellow to red).

On cooling, it regains its original yellow colour.

No new substance is formed during the change.

The change is reversible.

Therefore, heating of lead oxide is a physical change.

5.Heating of sugar is a permanent change. Give reason.

On heating, sugar decomposes and forms new substances such as carbon (charcoal) and water vapour.

The colour changes from white to brown and then black.

The properties of the new substances are different from those of sugar.

The original sugar cannot be obtained back, so the change is irreversible.

Therefore, heating of sugar is a permanent (chemical) change.

C. PICTURE BASED QUESTIONS.

1)

Fig-shows a burning candle.

(a) Name the change taking place-

Burning of a candle is both a physical and a chemical change.

b)In the burning candle, identify one physical change and one chemical change.

Physical change: Melting of candle wax.

Chemical change: Burning of wax vapour to form carbon dioxide and water vapour.

c)Name the new substances formed when a candle burns.

Carbon dioxide (CO_2)

Water vapour (H_2O)

d)What two forms of energy are produced when the candle burns?

Answer: Heat energy and light energy are produced.

2)Fig Heating of Mercury Oxide

a.What type of change takes place when mercuric oxide is heated? Give one reason.

Answer: It is a chemical change because new substances (mercury and oxygen) are formed.

b.Name the two new substances formed during the experiment.

Answer:

Mercury (Hg)

Oxygen gas (O_2)

c.What observation shows that oxygen gas is produced?

Answer: A glowing wooden splint rekindles (bursts into flame), showing that oxygen gas is produced.

d.What observation shows that mercury is formed?

Answer: Tiny silvery droplets of mercury are seen on the cooler part of the test tube.

e.Why is the heating of mercuric oxide called a permanent change?

Answer: It is a permanent change because new substances are formed and the original mercuric oxide cannot be obtained back easily.

f.What is the role of the Bunsen burner in this experiment?

Answer: The Bunsen burner provides heat energy required to decompose mercuric oxide into mercury and oxygen.

g.Which gas produced in this experiment supports combustion? How do you know?

Answer: Oxygen gas supports combustion because it rekindles a glowing wooden splint.

3)hHeating of Sugar crystals

a)What is the first visible change observed when sugar is heated gently?

Answer: The sugar crystals melt to form a colourless liquid.

b)As heating continues, what colour changes are observed in the sugar?

Answer: The sugar changes from colourless to light brown, then dark brown, and finally black.

c)Can the original white sugar crystals be obtained after heating?

Answer: No. This suggests the change is permanent and irreversible.

d)What gas or vapour is observed during the heating of sugar?

Answer:Water in form of steam is given out which condenses on the cooler parts of the test tube.

e)Sugar on heating decomposed to form- charcoal

CASE BASED QUESTIONS.

1)During a chemistry practical, a student heated a shiny grey metal ribbon (X)in air. The ribbon burnt with a flame Y and formed a white ash Z. The students carefully observed the changes.

a) Identify X and Z

X-Magnesium ribbon.

Z- Magnesium Oxide

b)Whay is the colour of the flame Y?

Dazzling white light

c)Which observation shows that a chemical reaction took place?

Answer: Formation of a new white substance (ash) and emission of bright light.

d)Write the balanced chemical equation for the reaction if X is magnesium.

Answer:

$2Mg + O_2 \rightarrow 2MgO$

e)Name the process that took place when ribbon X combined with air.

Answer: Oxidation (burning/combustion).

2)A student added a few crystals of ammonium chloride to a beaker of water and stirred the mixture. The crystals dissolved completely to form a clear solution. After some time, the beaker felt cool to touch, and the temperature of the solution decreased.

a)What happened to the ammonium chloride crystals?

Answer: They dissolved completely in water

b)What type of mixture was formed?

Answer: A homogeneous mixture (solution).

c)Is the process physical or chemical? Give one reason.

Answer: It is a physical change because no new substance is formed.

d)Is the dissolution of ammonium chloride endothermic or exothermic?

Answer: Endothermic.

e)Why did the beaker become cool?

Answer: Because heat was absorbed from the surroundings.

3)A student added a small amount of a white solid (X) to water in a beaker. The beaker soon became hot, steam was produced, and a white suspension (Y) was formed. The teacher asked the students to observe the changes carefully before identifying substance X.

a) Identify X and Y?

X- quick lime

Y-Slaked lime

b)Based on the observations, what can you infer about substance X?

Answer: X is a reactive substance that forms a new product and releases heat when mixed with water.

C)Is the reaction exothermic/Endothermic reaction?

Answer -Exothermic

d)Write the word equation if X is quick lime.

Answer: Quick lime + Water ⟶ Slaked lime + Heat.

GIVE DIFFERENCE ON BASIS OF CRITERIA GIVEN

1)

Basis of Difference	Exothermic Reaction	Endothermic Reaction
Heat Flow	Heat is given out.	Heat is taken in.
Temperature of Surroundings	Increases (surroundings become warmer).	Decreases (surroundings become cooler).
Example	Quick lime + Water ⟶ Slaked lime + Heat	Ammonium chloride + Water ⟶ Solution (Heat absorbed)
Observation	Heat, and sometimes light, may be produced.	The reaction mixture becomes cold; no heat is felt outside.

2)

Basis of Difference	Physical Change	Chemical Change
Definition	A change in which no new substance is formed.	A change in which one or more new substances are

		formed.
New Substance	Not formed.	Formed
Nature of Change	Temporary.	Permanent
Reversibility	Usually reversible.	Irreversible
Chemical Composition	Remains unchanged.	Changes

NAME THE FOLLOWING

1.Name the type of change in which no new substance is formed.

Answer: Physical change

2.Name the type of change in which a new substance is formed.

Answer: Chemical change

3.Name the gas that supports the burning of magnesium ribbon.

Answer: Oxygen

4.Name the white ash formed when magnesium ribbon burns in air.

Answer: Magnesium oxide

5.Name the reaction in which heat is released to the surroundings.

Answer: Exothermic reaction

6.Name the reaction in which heat is absorbed from the surroundings.

Answer: Endothermic reaction

7.Name the substance formed when quick lime reacts with water.

Answer: Slaked lime (Calcium hydroxide)

8.Name the metal commonly used to demonstrate burning with a dazzling white flame in the laboratory.

Answer: Magnesium

CHAPTER 3

ELEMENTS, COMPOUNDS AND MIXTURES

1)GIVE DIFFERENCE ON BASIS OF SPECIFIC CATEGORY

Basis of Difference	ELEMENTS	COMPOUNDS
Definition	A pure substance made up of only one kind of atom.	A pure substance formed by the chemical combination of two or more elements in a fixed ratio.
Composition	Contains only one type of atom.	Contains two or more different types of atoms chemically combined.
Chemical Combination	Atoms are not chemically combined with different elements.	Elements are chemically combined.
Separation	Cannot be broken down into simpler substances by chemical means.	Can be broken down into simpler substances (elements) by chemical methods.
Basis of Difference	EVAPORATION	DISTILLATION
Principle	Difference in volatility; the liquid evaporates	Difference in boiling points of liquids.
What is Obtained?	The solid residue is obtained.	The pure liquid (distillate) is obtained
Recovery of Liquid	The liquid is not recovered.	The liquid is recovered after condensation.
Suitable For	Separating non-volatile solids from liquids.	Obtaining pure liquids or separating miscible liquids.
Cost and Setup	Simple and inexpensive	More complex and requires special apparatus.
Basis of Difference	DISTILLATION	FRACTIONAL DISTILLATION

Definition	A method used to separate a liquid from a solution or two liquids with a large difference in boiling points.	A method used to separate two or more miscible liquids having close boiling points.
Principle	Difference in boiling points.	Difference in boiling points(10 -20 degree or more) using repeated evaporation and condensation.
Fractionating Column	Not used	A fractionating column is used.
Purity of Product	Produces a fairly pure liquid.	Produces liquids of higher purity
Apparatus	Distillation flask, condenser and receiver.	Distillation flask, fractionating column, condenser and receiver.

2)NAME THE FOLLOWING

1)Name the method used to separate a dissolved solid from a liquid by heating the solution.

Answer: Evaporation

2)Name the method used to obtain pure water from a salt solution.

Answer: Distillation

3)Name the method used to separate two miscible liquids having close boiling points.

Answer: Fractional distillation

4)Name the apparatus used to separate two immiscible liquids of different densities.

Answer: Separating funnel

5)Name the method used to separate the different coloured pigments present in black ink.

Answer: Paper chromatography

6)Name the method used to separate kerosene and water in the laboratory.

Answer: Separating funnel

7)Name the pure substance made up of only one kind of atom.

Answer: Element

8)Name the pure substance formed by the chemical combination of two or more elements.

Answer: Compound

9)Name the type of matter formed by physically mixing two or more substances.

Answer: Mixture

10)Name the smallest particle of an element that retains its properties.

Answer: Atom

3)GIVE EXAMPLE

1)Give one example of an element.

Answer: Iron (Fe)

2)Give one example of a compound.

Answer: Water (H_2O)

3)Give one example of a homogeneous mixture.

Answer: Salt solution

4)Give one example of a heterogeneous mixture.

Answer: Sand and water

5)Give one example of an alloy.

Answer: Brass

6) Separation method -Evaporation, Distillation, Fractional distillation

7) Solvent other than water- Ethanol,Benzene,Carbon tetrachloride

8)Miscible liquid liquid mixture - acetone +water,acetone+ethyl alcohol, methyl alcohol+ethyl alcohol

4)GIVE REASON

1)Brass is an alloy.

Answer: Brass is an alloy because it is made by mixing copper and zinc in a definite proportion.

The two metals are physically mixed and not chemically combined, so brass is an alloy (a homogeneous mixture).

2.Sugar solution is a homogeneous mixture.

Sugar solution is a homogeneous mixture because sugar dissolves completely in water and is uniformly distributed throughout the solution. The composition is the same in every part of the solution, and the sugar particles cannot be seen separately.

3.Paper chromatography is used to separate the colours in black ink.

Paper chromatography separates the different dyes in black ink because each dye moves at a different speed on the paper with the solvent

4.Fractional distillation is used to separate alcohol and water.

Fractional distillation is used because alcohol and water are miscible liquids with different boiling points. On heating, alcohol (boiling point ≈ 78°C) vaporises before water (boiling point 100°C).

5)A separating funnel is used to separate oil and water.

A separating funnel is used because oil and water are immiscible liquids and do not mix with each other. Since water is denser than oil, it settles at the bottom while oil forms the upper layer. The tap of the separating funnel is opened to drain out the lower water layer first, leaving the oil behind, thus separating the two liquids.

) PICTURE BASED5

1)Mixture of Iron and Sulphur(Fig 3.12a 3.12b pg49)

a)What is the colour of sulphur in the mixture

Yellow

b)Which component of the mixture is attracted by a magnet?

Answer: Iron filings.

c)What happens when the mixture of iron and sulphur is treated with carbon disulphide?

Answer: Sulphur dissolves, while iron remains undissolved.

d)Which experiment proves that the components of a mixture can be separated by physical methods?

Answer: Separation using a magnet and dissolution in carbon disulphide.

e)Why is iron sulphide not attracted by a magnet?

Answer: Because iron has chemically combined with sulphur to form a new compound.

f)What happens when iron sulphide is treated with carbon disulphide?

Answer: It does not dissolve.

g)Why does iron sulphide not dissolve in carbon disulphide?

Answer: Because it is a compound and has properties different from its constituent elements.

h)What conclusion can be drawn from the magnet experiment?

Answer: The constituents of a mixture can be separated by physical means, but those of a compound cannot.

i)Which has retained the properties of its constituents—the mixture or the compound?

Answer: The mixture.

j)State one difference between the mixture of iron and sulphur and the compound iron sulphide based on the experiment.

Answer: In the mixture, iron can be separated by a magnet, whereas in iron sulphide, iron cannot be separated by a magnet because it is chemically combined with sulphur.

2)Fig 3.15 page 53.

a)What separation method is shown in the figure?

Answer: Distillation.

b)What is the function of the Liebig's condenser?

Answer: It cools the steam and converts it into liquid water.

c)What is the pure liquid collected after distillation called?

Answer: Distillate (or distilled water).

d)On which principle does the process of distillation work?

Answer: Distillation works on the principle of the difference in boiling points of substances, followed by evaporation and condensation

e)Mention one country or region where drinking water is obtained by distillation of sea water?

Answer: Gulf Countries

f)What is the main use of distillation in this experiment?

Answer: To obtain pure water from salt solution.

2)Fig 3.16

a)Which separation method is shown in Fig. 3.16?

Answer: Sublimation.

b)What is the white solid deposited on the inner wall of the funnel called?

Answer: Sublimate (ammonium chloride).

c)Why is an inverted funnel used in the sublimation setup?

Answer: To collect the vapours of ammonium chloride as a solid.

d)What is the function of the cotton wool plug?

Answer: It prevents the vapours from escaping.

e)Name another substance that can be separated by sublimation.

Answer: Iodine.

3)Fig 3.17

a)Which separation method is shown in Fig. 3.17?

Answer: Separating funnel.

b)Which two liquids are present in the separating funnel?

Answer: Kerosene oil and water.

c)Which liquid forms the upper layer in the funnel?

Answer: Kerosene oil.

d)Which liquid forms the lower layer in the funnel?

Answer: Water.

e)Why does water settle below kerosene?

Answer: Because water is denser (heavier) than kerosene.

f)What type of liquids are kerosene and water?

Answer: Immiscible liquids.

g)On which principle does a separating funnel work?

Answer: Difference in the densities of immiscible liquids.

4)Fig 3.20

a)Which separation method is shown in Fig. 3.20?

Answer: Paper chromatography.

b)What is the purpose of paper chromatography?

Answer: To separate coloured substances present in a solution.

c)Why is the lower end of the filter paper dipped in the solvent?

Answer: So that the solvent can rise through the paper by capillary action.

d)Why do different colours appear on the filter paper?

Answer: Because different dyes travel at different speeds in the solvent.

e)State the principle on which paper chromatography works.

Answer: Paper chromatography works on the principle that different coloured substances have different solubilities in the same solvent and therefore move at different speeds on the filter paper.

f)Is paper chromatography a physical or a chemical method of separation?

Answer: It is a physical method of separation

CASE BASED

1)A student was given an unknown liquid mixture X. The teacher heated it using a special apparatus Y. During heating, one liquid changed into vapour first, passed through a cooling tube, and was collected in a receiver as a pure liquid. The second liquid remained in the flask until the temperature increased further. The separation was possible because the two liquids had different boiling points.

a)Identify the separation method used in the experiment.

Answer: Fractional distillation.

b)What type of mixture was X?

Answer: A mixture of two miscible liquids.

c)Identify apparatus Y.

Answer: Fractional distillation apparatus.

d)On which principle does this method work?

Answer: Difference in boiling points (between 10-20 degree celcius)

e)Which liquid is collected first?

Answer: The liquid with the lower boiling point.

f)Why does the second liquid remain in the flask initially?

Answer: Because it has a higher boiling point.

g)What is the function of the cooling tube?

Answer: It cools the vapour and converts it into a liquid.

h)What is the liquid collected in the receiver called?

Answer: Distillate.

j)Is this a physical or a chemical method of separation?

Answer: Physical method.

k)Name one mixture that can be separated by this method.

Answer: Alcohol and water.

l)Which part of apparatus Y makes this method different from simple distillation?

Answer: Fractionating column.

2)A student placed a drop of unknown black ink (X) on a strip of filter paper and dipped the lower end of the paper into a solvent (Y). After some time, several coloured spots appeared at different heights on the paper.

a)Identify the separation technique used.

Answer: Paper chromatography.

b)What was substance X?

Answer: Black ink.

C)What was substance Y?

Answer: Solvent.

d)What does the appearance of different coloured spots indicate?

Answer: Black ink contains different coloured dyes.

e)On which principle does paper chromatography work?

Answer: Difference in the solubility of coloured substances in the same solvent.

f)Can this method be used to separate coloured dyes in food colouring?

Answer: Yes.

Picture-Based Observation Questions

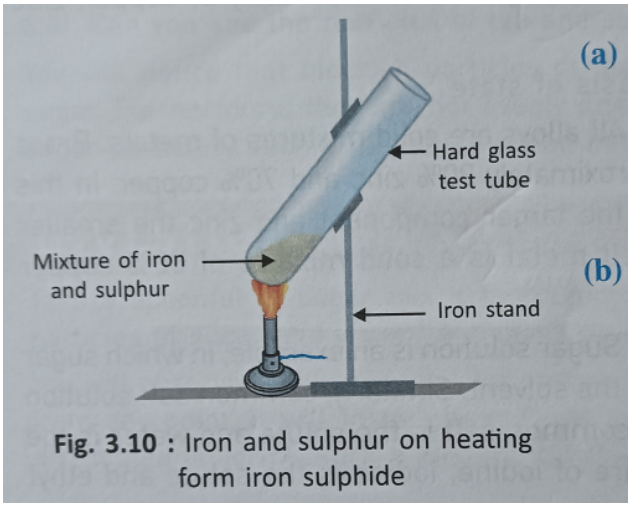

Fig. 3.10 : Iron and sulphur on heating form iron sulphide

a)Which two substances are taken in the test tube?

Answer: Iron and sulphur.

b)Which apparatus is used to hold the test tube?

Answer: Iron stand (with clamp).

c)What happens to the mixture when it is heated?

Answer: Iron and sulphur react to form iron sulphide.

d)What is the name of the black substance formed after heating?

Answer: Iron sulphide.

e)Is the change shown in the figure a physical or a chemical change?

Answer: Chemical change.

f)Why is this change considered a chemical change?

Answer: Because a new substance, iron sulphide, is formed.

g)Write the word equation for the reaction.

Answer: Iron + Sulphur → Iron sulphide.

h)Which property of iron is lost after forming iron sulphide?

Answer: Its magnetic property.

i)What does this experiment prove about compounds?

Answer: Compounds have properties different from their constituent elements.

j)State one conclusion from the experiment.

Answer: Iron and sulphur chemically combine on heating to form a new compound called iron sulphide, which has properties different from iron and sulphur.

2)

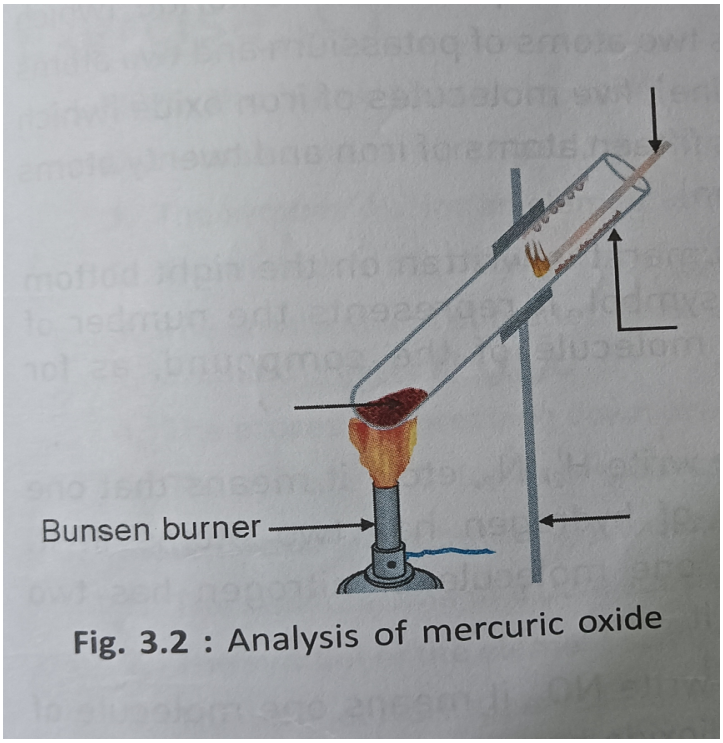

Fig. 3.2 : Analysis of mercuric oxide

a)Which compound is being heated in the test tube?

Answer: Mercuric oxide.

b)Which gas is released during the experiment?

Answer: Oxygen.

c)How can the gas released be identified?

Answer: It rekindles a wooden glowing splint.

d)What change occurs when mercuric oxide is heated?

Answer: It decomposes into mercury and oxygen.

e)Which metal is formed during the decomposition?

Answer: Mercury.

f)Where is mercury seen in the test tube?

Answer: On the cooler upper part of the test tube.

g)What is the appearance of mercury formed?

Answer: A shiny silvery liquid.

i)Write the word equation for the reaction.

Answer: Mercuric oxide ⟶ Mercury + Oxygen.

j)State one conclusion from this experiment.

Answer: Mercuric oxide is a compound that decomposes on heating to form mercury and oxygen, showing that compounds can be broken down only by chemical means.

k)Is this a physical or a chemical change?

Answer: Chemical change.

Why is this change considered a chemical change?

Answer: Because new substances are formed.

CHAPTER 4 ATOMIC STRUCTURE

A.GIVE EXAMPLE

1)subatomic particle-proton,electron and neutron.

2)monoatomic molecules- helium,argon,krpton
3)diatomic molecules-nitrogen,oxygen
4)triatomic molecules-ozone
5)polyatomic molecules-phosphorous
6)monovalent electropositive ions-hydrogen,sodium
7)bivalent electropositive ions-magnesium,calcium
8)trivalent electropositive ions-chromium,aluminium
9)Variable electropositive ions-iron
10)Monovalent electronegative valency-chlorine,bromide
11)bivalent electronegative valency-sulphate,peroxide
12)trivalent electronegative valency—phosphate,phosphite

B.GIVE DIFFERENCE ON BASIS OF

1. Differentiate between Atom and Molecule.((i) Definition (ii) Independent existence (iii) Example)

Atom	Molecule
Smallest particle of an element.	Smallest particle of a substance that can exist independently.
Cannot usually exist independently (except noble gases).	Can exist independently.
Example: He, Na	Example: O_2, H_2O

2. Differentiate between Proton and Electron.((i) Charge (ii) Location (iii) Relative mass)

Proton	Electron
Has a positive (+1) charge.	Has a negative (−1) charge.
Found in the nucleus.	Found in shells around the nucleus.
Heavy compared to an electron.	Very light compared to a proton.

3. Differentiate between Proton and Neutron.((i) Charge (ii) Function (iii) Location)

Proton	Neutron
Positively charged.	Has no charge.
Determines the atomic number.	Helps determine the mass number.
Present in the nucleus.	Present in the nucleus.

4. Differentiate between Nucleus and Electron Shell.((i) Position (ii) Contents (iii) Mass)

Nucleus	Electron Shell
Located at the centre of the atom.	Surrounds the nucleus.
Contains protons and neutrons.	Contains electrons.
Contains almost all the mass of the atom.	Has very little mass.

5. Differentiate between Electron and Neutron.((i) Charge (ii) Location (iii) Relative mass)

Electron	Neutron
Negative charge.	No charge.
Present in shells.	Present in the nucleus.
Very small mass.	Mass nearly equal to a proton.

CASE BASED QUESTION

Rahul writes:

"The nucleus contains protons, electrons and neutrons."

His friend corrects him.

Questions

1. Which particle is incorrectly placed in the nucleus?
   Answer: Electron.

2. Where are electrons found?
   Answer: In shells around the nucleus.

3. Which particles are present inside the nucleus?
   Answer: Protons and neutrons.

4. Which particle carries a negative charge?
   Answer: Electron.

5. Why is the nucleus positively charged?
   Answer: Because it contains positively charged protons.

A teacher displays three statements.

- Atom A: Electrons are inside the nucleus.
- Atom B: Electrons revolve around the nucleus in shells.
- Atom C: Protons revolve around electrons.

Questions

1. Which model is correct?
   Answer: Atom B.

2. What is present inside the nucleus?
   Answer: Protons and neutrons.

3. Which particle moves around the nucleus?
   Answer: Electron.

4. Which particle has negligible mass?
   Answer: Electron.

5. Why are shells important?
   Answer: They represent energy levels where electrons are arranged.

GIVE REASON

1. Iron shows two different valencies, +2 and +3. Explain why iron exhibits variable valency.

Answer: Iron has the electronic configuration 2,8,14,2. It can lose either 2 electrons from the outermost shell to form Fe^{2+} or 3 electrons (2 outermost electrons and 1 from the next shell) to form Fe^{3+}. Hence, iron shows variable valency.

2. Why do negatively charged electrons not fall into the nucleus?

- Electrons move very fast around the nucleus.
- They stay in fixed energy levels (shells).
- The nucleus attracts electrons, but they do not fall into it.

- This keeps the atom stable.

3. An atom is electrically neutral.

An atom is electrically neutral because it has an equal number of protons (positive charges) and electrons (negative charges). Their charges cancel each other.

PICTURE BASED QUESTION
1.FIG 4.2 PAGE 67

1. Which part of the atom is present at the centre of the picture?

Answer: The nucleus.

---

2. Which two subatomic particles are present inside the nucleus?

Answer: Protons and neutrons.

---

3. Which particle is shown moving around the nucleus?

Answer: Electrons.

---

4. What is the charge of the particle shown in the outer shells?

Answer: Negative (−).

---

5. Name the positively charged particle shown inside the nucleus.

Answer: Proton.

---

6. Which subatomic particle has no charge?

Answer: Neutron.

7. What are the circular paths around the nucleus called?

Answer: Electron shells (energy levels).

---

8. Which part of the atom contains most of its mass?

Answer: The nucleus.

---

9. If the picture shows equal numbers of protons and electrons, what is the overall charge of the atom?

Answer: The atom is electrically neutral.

---

10. Count the electrons in the outermost shell. What does this number represent?

Answer: It represents the **valence electrons** (electrons in the outermost shell).

COMPETENCY FOCUSED QUESTIONS

Match Column A with the correct option from Column B.

Column A.	Column B
(a) H–H.	(i) Carbon dioxide
(b) O–O.	(ii) Water
c) H–O–H.	(iii) Hydrogen
(d) O–C–O.	(iv) Oxygen

Answer: (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)