

Time : 3 Hours

SCIENCE SAMPLE PAPER-6

Maximum Marks : 80

General Instructions :

STD-X

- (i) The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.
- (ii) Section-A – question no. 1 to 20 all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.
- (iii) Section-B – question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should be in the range of 30 to 50 words.
- (iv) Section-C – question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should be in the range of 50 to 80 words.
- (v) Section-D – question no. 34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.
- (vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (vii) Wherever necessary, neat and properly labelled diagrams should be drawn.

SECTION - A

1. What change in colour is observed when white silver chloride is left exposed to sunlight? State the type of chemical reaction in this change. [1]

Ans. Silver chloride becomes grey. It is a photochemical decomposition reaction.

OR

Write a balanced chemical equation for the reaction between sodium chloride and silver nitrate indicating the physical state of the reactants and the products.

Ans. $\text{AgNO}_3(\text{aq}) + \text{NaCl}(\text{aq}) \rightarrow \text{AgCl}(\text{s}) + \text{NaNO}_3(\text{aq})$

2. Lithium, sodium and potassium form a Dobereiner's triad. The atomic masses of lithium and potassium are 7 and 39 respectively. Predict the atomic mass of sodium. [1]

Ans. Atomic mass of sodium (Na) = $\frac{7 + 39}{2} = \frac{46}{2} = 23$.

3. Organic compounds having the same molecular formula, but different structural formula, are called: [1]

(a) allotropes (b) isomers (c) isotopes (d) isobars

Ans. (b)

4. A positively charged particle (alpha-particle) projected towards west is deflected towards north by a magnetic field. Find the direction of magnetic field. [1]

Ans. Upward (apply Fleming's left-hand rule).

5. What is the maximum resistance that can be made using five resistors each of $1/5 \Omega$? [1]

Ans. 1Ω

6. Name the device used for measuring electric current. [1]

Ans. Ammeter

OR

Why are copper and aluminium wires usually employed for electricity transmission?
Ans. Copper and aluminium have very low resistivity. Thus, large amount of current is transmitted through them without any wastage.

7. *A glass prism is able to produce a spectrum when white light passes through it but a glass slab does not produce any spectrum. Explain why is it so?*

Ans. For dispersion, the two refracting surfaces must be inclined to each other as in case of prism. [1]
In rectangular glass slab, the refracting surfaces are parallel to each other. So, dispersion cannot occur.

8. *What are two factors on which lateral displacement of an emergent ray from a glass slab depends?*

Ans. (i) Angle of incidence (ii) Thickness of glass slab. [1]

9. *What does the direction of thumb indicate in the right-hand thumb rule?*

Ans. Direction of current. [1]

OR

A circular coil carrying current is held in horizontal plane. In which direction will be its magnetic field?

Ans. The magnetic field will be in the vertical plane.

10. *Name one sexually transmitted disease caused due to viral infection.* [1]

Ans. AIDS (Acquired Immuno-deficiency Syndrome)

11. *What are the functions performed by testis in human beings?* [1]

Ans. Two functions performed by testis in human beings are as follows :

- (i) Formation of sperms
- (ii) Secretion of the hormone testosterone

OR

Give a difference between regeneration and fragmentation.

Ans. In fragmentation each small part grows into a full organism while in regeneration if an organ of an organism get damaged, it regenerates.

12. *State two problems caused by the non-biodegradable waste that we generate in our daily life.* [1]

Ans. Two problems caused by non-biodegradable waste that we generate in our daily life are :

- (i) It clogs drains.
- (ii) It causes water and soil pollution.

OR

What will happen if we kill all the organisms in one trophic level?

Ans. If we kill all the organisms in one trophic level the organisms in previous trophic level will increase and the organisms in next trophic level will die of starvation.

13. *Why do herbivores have longer, small intestine than carnivores?* [1]

Ans. Digestion of cellulose needs an enzyme cellulase. Hence, herbivores have a longer small intestine to allow complete digestion of cellulose.

Directions (14-16): For question numbers 14, 15 and 16, two statements are given – one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :

- (a) Both A and R are true, and R is the correct explanation of the assertion.
- (b) Both A and R are true, but R is not the correct explanation of the assertion.
- (c) A is true, but R is false.
- (d) A is false, but R is true.

14. **Assertion:** Phosphorus cannot be kept in air.
Reason: Phosphorus spontaneously melts in air.

Ans. (c)

15. **Assertion:** Saliva contains salivary amylase.
Reason: Pepsin digests lipids.

Ans. (c)

OR

Assertion: Pyruvate is a three carbon molecule.

Reason: It is prepared in cytoplasm as a first step to cellular respiration.

Ans. (a)

16. **Assertion:** All the crow species are entirely black in colour.

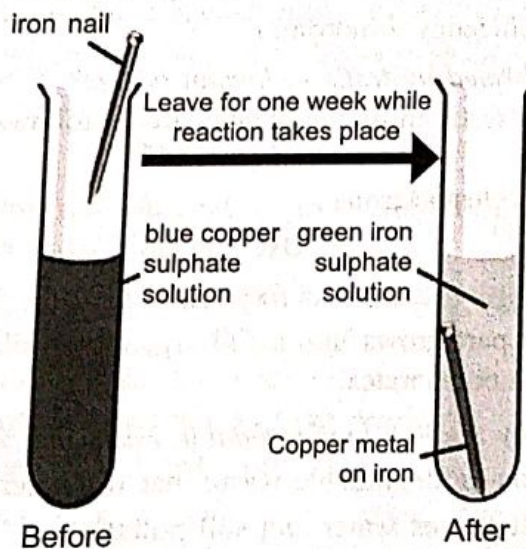
Reason: The colour of the crows is a biological adaptation.

Ans. (d)

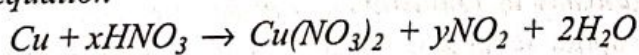
Directions (17-20): Answer Q. No. 17-20 contain five sub-parts each. You are expected to answer any four sub-parts in these questions.

17. Read the following and answer any four questions from 17(i) to 17(v).

Observe the diagram carefully and answer the questions that follow.



(i) The equation



The values of x and y are

(a) 3 and 5

(b) 8 and 6

(c) 4 and 2

(d) 7 and 1

(ii) What happens when copper rod is dipped in iron sulphate solution :

(a) Copper displaces iron

(b) Blue colour of copper sulphate solution is obtained

(c) No reaction takes place

(d) Reaction is exothermic

(iii) A substance which oxidised itself and reduces other is known as :

(a) Oxidising agent

(b) Reducing agent

(c) Both (a) and (b)

(d) None of these

(iv) $\text{Fe}_2\text{O}_3 + 2\text{Al} \rightarrow \text{Al}_2\text{O}_3 + 2\text{Fe}$

The above reaction is an example of a :

- (a) Combination reaction
(c) Decomposition reaction

- (b) Double displacement reaction
(d) Displacement reaction


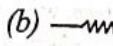

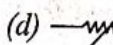
- (v) Name the products formed when iron filings are heated with dilute hydrochloric acid.
(a) Fe (III) chloride and water
(b) Fe (II) chloride and water
(c) Fe (II) chloride and hydrogen gas
(d) Fe (III) chloride and hydrogen gas

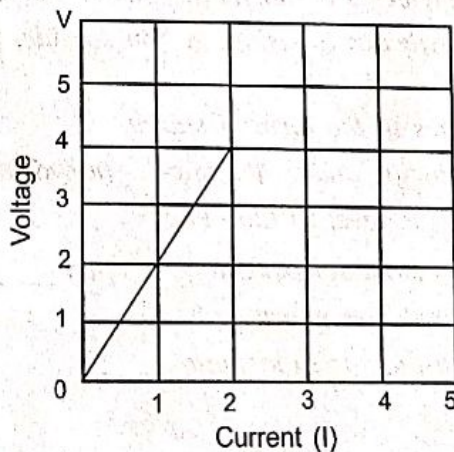
Ans. (i) (c) (ii) (c) (iii) (b) (iv) (d) (v) ~~(d)~~ (c)

18. Read the following and answer any four questions from 18(i) to 18(v).

[1×4]

Electricity is the transfer of electrons from one atom to another. Electrons have a negative charge, they sometimes are attracted to atoms that have a positive charge. Electrons orbit in an area that surrounds the nucleus of an atom. Electrons then sometimes jump to the shells of nearby atoms as they orbit. This jumping or movement of electrons creates electric current. Current is what flows through electrical wires and power electronics items, from light bulbs to televisions.

- (i) When electric current is passed, electrons move from :
(a) high potential to low potential (b) low potential to high potential
(c) in the direction of the current (d) none of these
- (ii) Which of the following is not correctly matched?
(a)  : An electric cell (b)  : A resistor
(c)  : Open plug key (d)  : A rheostat
- (iii) Coulomb is the SI unit of :
(a) charge (b) current (c) potential difference (d) resistance
- (iv) Three resistors of 1 Ω, 2 Ω and 3 Ω are connected in parallel. The combined resistance of the three resistors should be :
(a) greater than 3 Ω (b) less than 1 Ω
(c) equal to 2 Ω (d) between 1 Ω and 3 Ω
- (v) The following graph shows current versus voltage values of some unknown conductor. What is the resistance of this conductor?



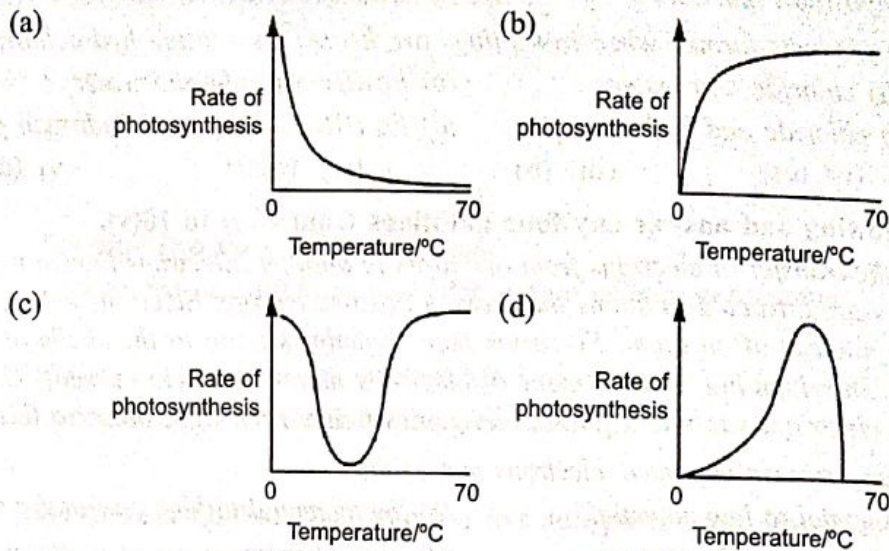
Ans. (i) (b) (ii) (c) (iii) (a) (iv) (b) (v) (a)

19. Read the following and answer any four questions from 19(i) to 19(v).

[1×4]

All living things need food and energy to survive. The food-making and energy process for plants to survive is called photosynthesis. Plants make food and produce oxygen through photosynthesis. This process is complex but with the sunlight, water, nutrients from the soil, oxygen, and chlorophyll, a plant makes its own food in order to survive. Chlorophyll is a green chemical inside a plant that allows plants to use the Sun's energy to make food. Without chlorophyll a green plant would not be able to survive.

(i) Which graph shows the effect of temperature on the rate of photosynthesis?



(ii) Which among the following statements is incorrect in view of the plants?

- (a) They convert solar energy into mechanical energy.
- (b) They prepare their own food from organic compounds.
- (c) They are also called producers.
- (d) They are the initial source of energy in a food chain.

(iii) Which of these reactions occur in photosynthesis?

- (a) Carbon dioxide is reduced and water is oxidised.
- (b) Water is reduced and carbon dioxide is oxidised.
- (c) Carbon dioxide and water are oxidised.
- (d) Carbon dioxide and water are reduced.

(iv) Which of the following statements about autotrophs is incorrect?

- (a) They synthesise carbohydrates by using carbon dioxide, water in the presence of sunlight and chlorophyll.
- (b) They store carbohydrates in the form of starch.
- (c) They convert carbon dioxide and water into carbohydrates in the absence of sunlight.
- (d) They form the first trophic level in food chain.

(v) The opening and closing of stomatal pore depend upon _____.

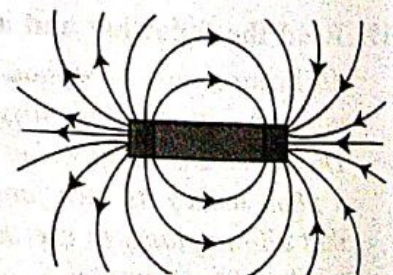
- (a) oxygen
- (b) water in guard cells
- (c) concentration of carbon dioxide in stomata
- (d) temperature

Ans. (i) (d) (ii) (b) (iii) (d) (iv) (c) (v) (b)

20. Read the following and answer any four questions from 20(i) to 20(v). [1×4]

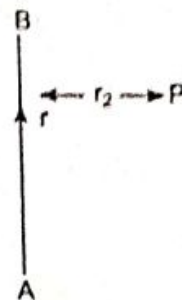
A magnet has a north and south pole. The north pole of a magnet will attract the south pole of a magnet. The north pole of a magnet will repel the north pole of another magnet, and the south pole will also repel the south pole. In short, like poles repel, and unlike poles attract.

The area surrounding a magnet is called its **magnetic field**. The magnetic field of a magnet is an invisible field which is created



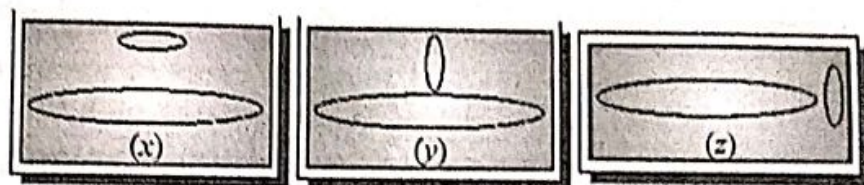
by its magnetism. To ancient people, magnetism probably seemed like magic. The force for magnets to attract or repel each other or to attract other objects is caused by moving electrons. Magnet may also be used to convert an unmagnetised piece of magnetic material, such as an iron nail, into a magnet. This is done by rubbing it with the magnet. This is called magnetisation. Magnets made by this way are called **temporary magnets** because they eventually lose their magnetism.

- (i) AB is a current-carrying conductor in the plane of the paper as shown in figure. What are the directions of magnetic fields produced by it at points P?
- (a) into the plane of paper
 (b) no field will be produced.
 (c) out of the plane of paper
 (d) none of these



- (ii) A soft iron bar is inserted inside a current-carrying solenoid. The magnetic field inside the solenoid will :
- (a) will decrease
 (b) will increase
 (c) will become zero
 (d) will remain the same

- (iii) If two circular coils are arranged in any of the three situations as shown in the diagrams below, then their mutual induction will be :

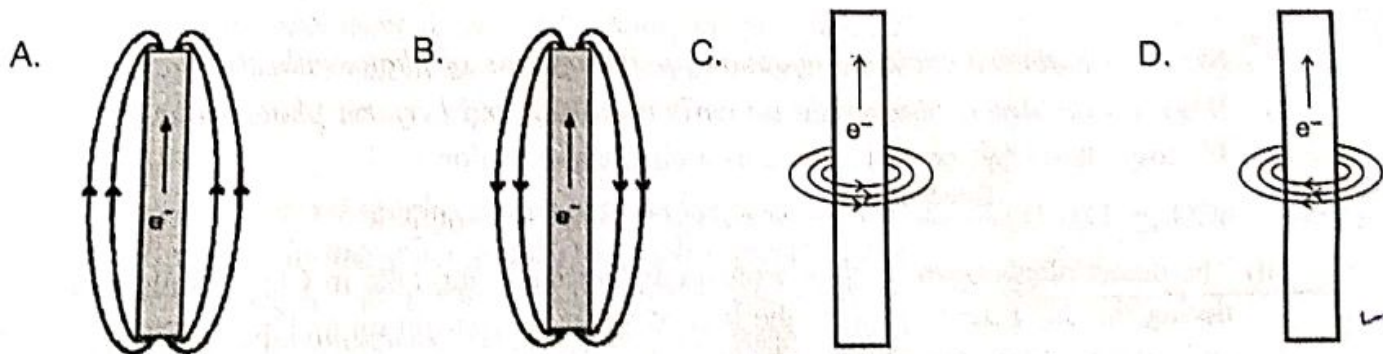


- (a) maximum in situation (x)
 (b) maximum in situation (y)
 (c) maximum in situation (z)
 (d) the same in all situations

- (iv) The shape of the magnetic field lines produced by a current-carrying conductor is :

- (a) straight lines
 (b) concentric circles
 (c) zig-zag lines
 (d) both (a) and (b)

- (v) Which of the following diagrams correctly shows the magnetic field produced by a current-carrying wire?



(a) A

(b) B

(c) C

(d) D

Ans. (i) (a)

(ii) (b)

(iii) (a)

(iv) (b)

(v) (d)

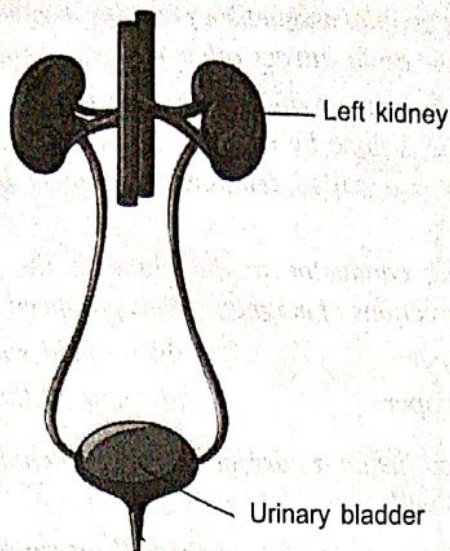
SECTION - B

21. Draw a neat diagram of excretory system of human beings and label on it:

- (i) Left kidney (ii) Urinary bladder

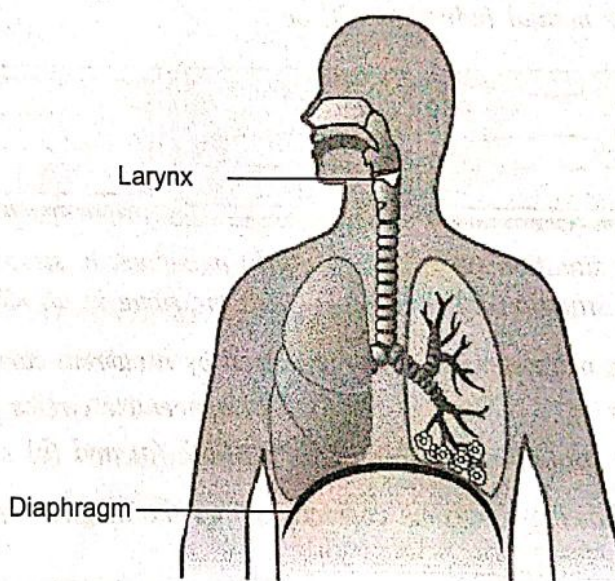
Ans. Excretory system of human

[2]



OR

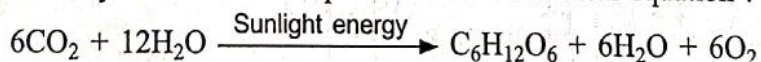
Draw a diagram of human respiratory system and label on it : (i) Diaphragm (ii) Larynx
 Ans. Respiratory system of human.



22. (i) Write the balanced chemical equation for the process of photosynthesis.

(ii) When do the desert plants take up carbon dioxide and perform photosynthesis? [2]

Ans. (i) Photosynthesis can be represented as a chemical equation :



(ii) The desert plants open up their stomata during night and take in CO_2 . Stomata remains close during the day time to prevent the loss of water by transpiration. They store the CO_2 in their cells and carry on the photosynthesis during day time.

23. Define homologous series of organic compounds. List its two characteristics. Write the name and formula of the first member of the series of alkenes. [2]

Ans. The series of organic compounds having same functional group and similar chemical properties is called homologous series. Each member differs from successive member by CH_2 —group. The difference in molecular weight between two successive members is $14u$.

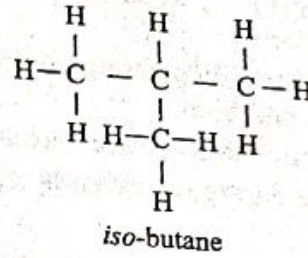
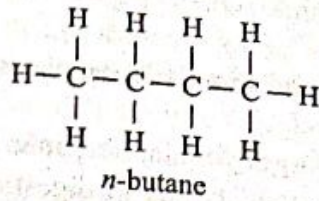
Characteristics :

- (i) It has same general formula, from which, all members can be derived.
- (ii) They have similar chemical properties.

C_2H_4 , $\text{CH}_2=\text{CH}_2$, ethene is the first member of alkene series.

OR

What are isomers? Draw the structures of two isomers of butane (C_4H_{10}).
 Ans. Organic compounds having the same molecular formula but different structural formulae, and hence, different physical and chemical properties are called isomers.
 Two isomers of butane (C_4H_{10}):



24. State reason for the following statements :

- (i) Name a salt which does not contain water of crystallisation.
- (ii) Ammonia is a base but does not contain hydroxyl group.

[2]

Ans. (i) $ZnSO_4$ (zinc sulphate)

(ii) Ammonia dissolves in water and forms OH^- ions. Therefore, it is basic in nature.

25. At what distance should an object be placed from a convex lens of focal length 18 cm to obtain an image at 24 cm from it on the other side. What will be the magnification produced in this case? [2]

Ans. $f = +18$ cm, $v = 24$ cm

Using, $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$, we get, $\frac{1}{u} = \frac{1}{v} - \frac{1}{f} = \frac{1}{24} - \frac{1}{18} = \frac{3-4}{72} = -\frac{1}{72}$
 $\Rightarrow u = -72$ cm

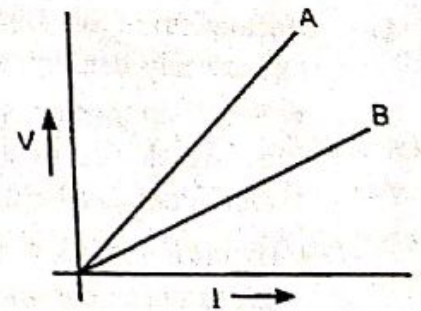
Object should be kept at a distance of 72 cm on the left side of the convex lens.

Magnification, $m = +\frac{v}{u} = \frac{24}{-72} = -\frac{1}{3}$

Image is inverted, real and diminished.

26. The V-I graph for two wires A and B is shown in the figure. If both wires are of same length and same thickness, which of the two is made of a material of high resistivity? Give justification for your answer. [2]

Ans. Greater than slope of V-I graph, greater will be the resistance of given metallic wire. In the given graph, wire A has greater slope than B. Hence, wire A has greater resistance. For the wires of same length and same thickness, resistance depends on the nature of material of the wire, i.e.



$$R_1 = \rho_1 \frac{l}{A} \text{ and } R_2 = \rho_2 \frac{l}{A}$$

$$\Rightarrow \frac{R_1}{R_2} = \frac{\rho_1}{\rho_2}$$

Thus $R \propto \rho$

Hence, wire 'A' is made up of a materials of high resistivity.

SECTION - C

27. Give the role of the following in digestion of food :

- (a) HCl in our stomach (b) Emulsification of fats (c) Pancreatic juice

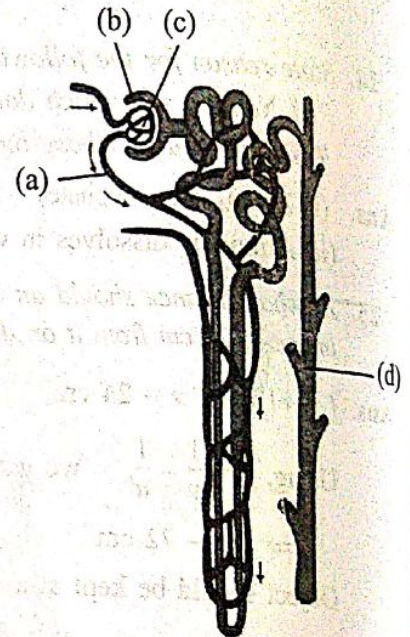
[3]

- Ans.** (a) (i) It sterilises food by killing pathogens and other microbes.
 (ii) It has a pH of 2, which is perfect for enzymes such as pepsin to break down proteins into simpler form.
 (iii) It helps emulsify food (digestion of protein and stimulates the pancreas to produce digestive enzymes and bile).
 (b) Emulsification of fats involves breakdown of large globules fats into smaller fats droplets.
 (c) Trypsin is the enzyme secreted by the pancreas which aids in digestion of proteins.

OR

Look at the given picture and answer the following :

- (i) Label the parts (a) to (d).
 (ii) Give one advantage of having a large number of these highly coiled structures in our kidneys.
 (iii) Mention any two substances which are selectively reabsorbed as the filtrate flows along the tubular part of this unit.



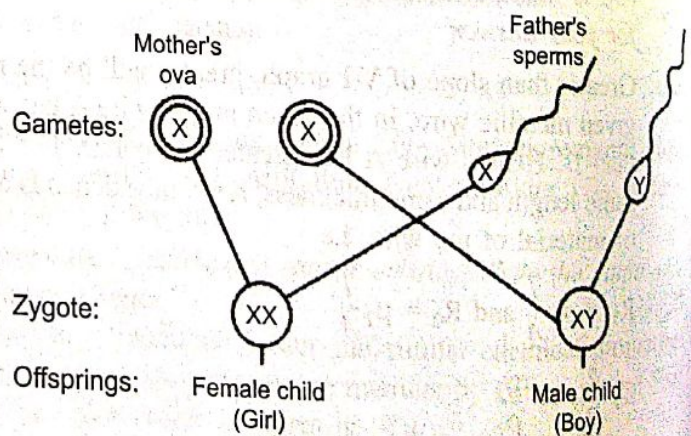
- Ans.** (i) (a) Renal artery
 (b) Bowman's capsule
 (c) Glomerulus
 (d) Collecting duct
 (ii) They help in increasing the surface area for filtration and proper reabsorption of useful substances.
 (iii) Glucose, amino acids, salts, water.

28. With the help of a flowchart explain in brief and show how the sex of a new born is genetically determined in human beings. Which of the two parents is responsible for determination of sex of the child?

[3]

Ans. Mechanism of Sex Determination in Human Beings : In human beings, the sex of the individual is genetically determined.

- Sex determination is the process by which sex of a new born individual can be determined.
- Human beings have one unpaired sex chromosome. Sex chromosome of male is XY and of female is XX.
- Sex of a child depends on what happens at fertilisation.
- If an ovum is fertilised by a sperm carrying X-chromosome, it will be a girl child.



• But if the ovum is fertilised by the sperm carrying Y-chromosome, it will be a boy child.
 Thus, father is responsible for the determination of the sex of a child.

29. "Damage to the ozone layer is a cause for concern." Justify this statement. Suggest any two steps to limit this damage.

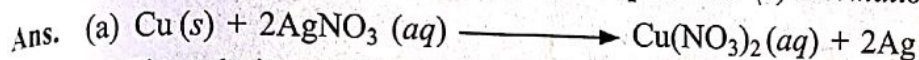
Ans. Ozone layer prevents the harmful ultraviolet radiation to enter the atmosphere and reach the earth's surface. Depletion of ozone layer has become a cause for concern because it can cause serious effects on human body and other organisms of the environment like fatal diseases such as skin cancer, changes in genetic material (DNA), eye damage, etc. [3]

Two steps to limit this damage are as follows :

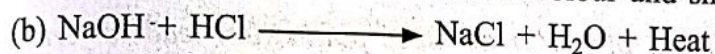
- Judicious use of aerosol spray propellants such as fluorocarbon and chlorofluorocarbons which cause depletion or hole in ozone layer.
- Limited use of supersonic planes.

30. Write the chemical equation of the reaction in which the following changes have taken place with an example of each : [3]

(a) Change in colour (b) Change in temperature (c) Formation of precipitate



The solution will become blue in colour and shiny silver metal will be deposited.



The temperature will increase because heat will be evolved.



Yellow precipitate of PbI_2 will be formed.

OR
Any other reactions can be written.

31. The position of three elements A, B and C in the periodic table is shown below : [3]

Group 16	Group 17
-	-
-	A
-	-
B	C

Giving reasons, explain the following :

- Element A is a non-metal.
- Element B has a larger atomic size than element C.
- Element C has a valency of 1.

Ans. (a) 'A' is non-metal because it can gain one electron easily as it has 7 valence electrons and forms negative ion with stable electronic configuration.

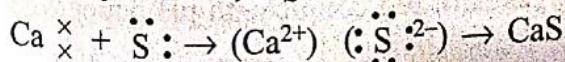
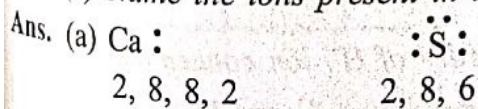
(b) It is because being in same period, 'B' has lesser atomic number, less nuclear charge, less force of attraction between valence electrons and nucleus therefore, has larger atomic size.

(c) 'C' has 7 valence electrons. It can gain one electron to become stable. So, its valency is equal to one.

32. (a) State the electron-dot structure for calcium and sulphur.

(b) Show the formation of CaS by the transfer of electrons.

(c) Name the ions present in this compound CaS . Atomic number of $\text{Ca} = 20$, $\text{O} = 16$. [3]



(c) Ca^{2+} and S^{2-} ions are present in CaS .

33. (a) What is meant by 'power of a lens'?

(b) State and define the S.I. unit of power of a lens.

(c) A convex lens of focal length 25 cm and a concave lens of focal length 10 cm are placed in close contact with each other. Calculate the lens power of this combination. [3]

Ans. (a) The ability of a lens to converge or diverge the ray of light after refraction is called power (P) of the lens. It is defined as the reciprocal of the focal length, i.e., $P = \frac{1}{f \text{ (in m)}}$

(b) The SI unit of power of a lens is 'diopetre'. A lens of focal length 100 cm has a power of 1 diopetre, i.e., 1 diopetre = 1 m⁻¹.

(c) Power of the combination

$$P = P_1 + P_2$$

$$= \frac{100}{25} + \frac{100}{-10} = 4 - 10 = -6 \text{ D.}$$

SECTION - D

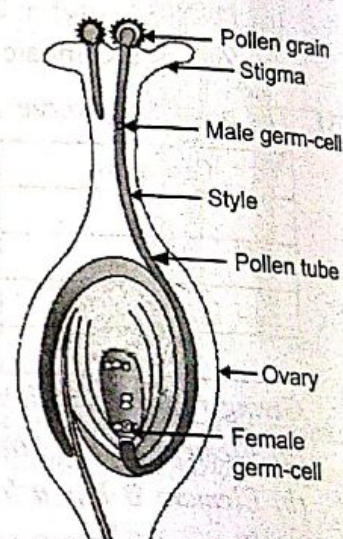
34. What is pollination? How does it occur in plants? How does pollination lead to fertilisation? Explain. [5]

Ans. **Pollination:** Transfer of pollen grains from anther to stigma is called pollination. It occurs in two ways.

(i) **Self-Pollination:** The transfer of pollen grains from the anther of a flower to the stigma of the same flower or of another flower born on the same plant is called self-pollination.

(ii) **Cross-pollination:** The transfer of pollen grains from anther of a flower of one plant to the stigma of a flower of another plant of the same species is called cross-pollination. As the pollen grains are not capable of locomotion, they have to depend on various agents for transmission. These agents are wind, water or animals.

Then pollination leads to fertilisation. After the pollen grains are deposited on the stigma, the pollen grains absorb water and sugar from the surface of stigma and swell up. A tube grows out of the pollen grains and travel through the style to reach the ovary. The pollen tube carrying two male gametes which are liberated inside the embryo sac. One male gamete fuses with the egg to form zygote. The other male gamete fuses with the secondary nucleus to form the endosperm, which provides nourishment to the growing embryo.



35. (i) Explain why is hydrochloric acid (HCl) a strong acid and acetic acid, a weak acid. How can it be verified?

(ii) Explain why does aqueous solution of an acid conduct electricity?

(iii) You have four solutions A, B, C and D. The pH of solution A is 6, B is 9, C is 12 and D is 7,

(a) Identify the most acidic and most basic solutions.

(b) Arrange the above four solutions in the increasing order of H⁺ ion concentration.

(c) State the change in colour of pH paper on dipping in solution C and D. [5]

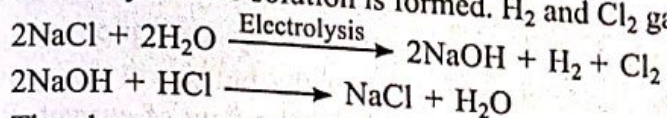
18. (i) Hydrochloric acid (HCl) is completely ionised in aqueous solution whereas acetic acid is partially ionised in aqueous solution. HCl gives dark red colour with pH paper whereas acetic acid (CH₃COOH) gives orange colour

- (ii) It is because acid ionises in aqueous solution and these ions conduct electricity.
- (iii) (a) 'A' is most acidic and 'C' is most basic.
 (b) $C (10^{-12}) < B (10^{-9}) < D (10^{-7}) < A (10^{-6})$
 (c) pH paper will become blue in 'C' and green in 'D'.

OR

- (i) Dry pellets of a base 'X' when kept in open absorbs moisture and turns sticky. The compound is also formed by chlor-alkali process. Write chemical name and formula of X. Describe chlor-alkali process with balanced chemical equation. Name the type of reaction occurs when X is treated with dilute hydrochloric acid. Write the chemical equation.
- (ii) While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid?
- (iii) (a) Identify the acid and the base whose combination forms the common salt that you use in your food. Write its formula and chemical name of this salt. Name the source from where it is obtained.
 (b) What is rock salt? Mention its colour and the reason due to which it has this colour.
 (c) What happens when electricity is passed through brine solution? Write the chemical equation for it.

Ans. (i) X is sodium hydroxide (NaOH). When sodium chloride solution (brine solution) is electrolysed, sodium hydroxide solution is formed. H_2 and Cl_2 gases are liberated. This is chlor-alkali process.



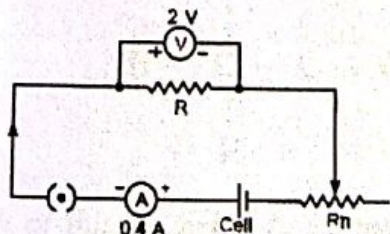
The above reaction is neutralisation reaction.

- (ii) It is because the process is highly exothermic. If water is added to acid, bottle of acid will break.
- (iii) (a) HCl is acid and NaOH is base whose combination forms the common salt. Its formula is NaCl (sodium chloride). It is obtained from sea water.
 (b) Rock salt is the common name for the mineral "halite". Its chemical formula is NaCl. It may be white or light blue or yellow depending upon the impurities present in it.
 (c) $2NaCl + 2H_2O \xrightarrow{\text{Electrolysis}} 2NaOH + H_2 + Cl_2$

36. When a high resistance voltmeter is connected directly across a resistor its reading is 2 V. An electric cell is sending the current of 0.4 A (measured by an ammeter) in the electric circuit in which a rheostat is also connected to vary the current. [5]

- (a) Draw an equivalent labelled circuit for the given data.
 (b) Find the resistance of the resistor.
 (c) Name and state the law applicable in the given case. A graph is drawn between a set of values of potential difference (V) across the resistor and current (I) flowing through it. Show the nature of graph thus obtained.

Ans. (a)



(b) Resistance of resistor is

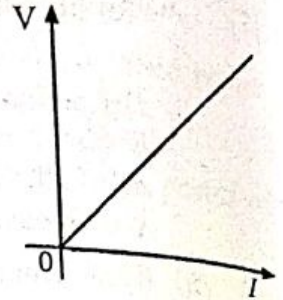
$$R = \frac{V}{I} = \frac{2}{0.4} = \frac{20}{4} = 5 \Omega$$

(c) **Ohm's law** : When the physical conditions such as temperature, density, length, etc. remain same, the current flowing through the conductor is directly proportional to the potential difference applied across the ends of the conductor, i.e.,

$$I \propto V \quad \text{or} \quad V \propto I$$

$$\Rightarrow \frac{V}{I} = \text{constant}$$

$$\Rightarrow V = IR$$



Where R is constant of proportionality and is called resistance of the wire. Since current varies linearly with potential difference, the graph between V and I will be a linear in nature as shown in figure.

OR

Three bulbs each having power P are connected in series in an electric circuit. In another circuit, another set of three bulbs of same power are connected in parallel to the same source.

- Will the bulbs in both the circuits glow with the same brightness? Justify your answer.
- Now let one bulb in each circuit get fused. Will the rest of the bulbs continue to glow in each circuit? Give reason.
- Representing each bulb by a resistor, draw circuit diagram for each case.

Ans. (a) Bulbs in parallel provide more illumination. This is because :

- each bulb gets same voltage and is equal to the applied voltage.
- each bulb draws required current from the mains. Hence, they work properly.

(b) When one bulb in each circuit get fused, in series, rest of the bulbs will not glow. This is because in series arrangement, there is only a single path for the flow of current. Rest of the bulbs will continue to glow as in parallel connection, because individual branch in the circuit completes its own circuit, or different paths are available for the flow of current.

(c) Circuit diagrams :

