SCIENCE

SUBJECT CODE : X-924

Time allowed : 3 hrs **Maximum Marks : 80**

General Instructions :

INSTRUCTION :

(i) All questions are compulsory.

(ii) **Question No. 1 to** 4 are objective type. Each question carries **1 × 5 = 5 Marks**

(iii) Internal options are given in **question no. 5 to 22.**

(iv) Marks of each question are medicated against it.

(v) Answer question no. **5 to 9** in about **30** words each

(vi) Answer question no. **10 to 14** in about **75** words each

(vii) Answer question no**. 15 to 19** in about **120** words each

(viii) Answer question no. **20 to 22** in about **150** words each

(ix) Draw meat and clean labeled diagram wherever required.

1. Choose and write the correct alternative. **1 × 5 = 5 Marks**

(i) A solution turns red litmus blue, its pH is likely to be :

(a) 1 (b) 4 (c) 5 (d) 10

(ii) The kidneys in human beings are a part of the system for :

(a) Nutrition (b) Respiration (c) Excretion (d) Transportation

Ans. (c) Excretion

(iii) The human eye forms the image of an object at its :

(a) a cornea (b) iris (c) Pupil (d*) retina

Ans. (d*) retina

(iv) S.I. unit of electric current is -

(a) Joule (b) Watt (c) Volt (d*) Ampere

Ans. (d*) Ampere

(v) Which of the following constitute a food chain?

(a) Grass, Wheat, and Mango (b) Grass, Goat and Human

(c) Goat, Cow and Elephant (d) Grass, Fish and Goat

Ans. (b) Grass–→Goat–→Human

Sol. (i) (d), Because red litmus turns blue in basic medium and baswe have pH more than 7.

(iii) (b) Grass ⟶Goat⟶Human

2. Fill in the blanks **1 × 5 = 5 Marks**

(i) Those reactions in which heat is released along with formation of products are called _____ reactions.

(ii) There are _____ group in modern periodic table.

(iii) Mendel proposed the law of inheritance.

(iv) The least distance of distinct vision for young adult with normal vision in about 25 cm.

(v) The energy transfer is 10% percent from one tropical level to another.

Sol. (i) exothermic

(ii) Mendel preposed the law of inheritance.

(ii) 18 groups

3. Match the column "A" with "B" **1 × 5 = 5 Marks**

"A"	**"B"**
(i) Sodium	(a) Our arm and a dog's foreleg
(ii) Nephron	(b) Voltameter
(iii) Endocrine gland	(c) Highly reactive metal
(iv) Homolgous organ	(d) Homone
(v) Measurement of potential difference	(e) Liquid metal
	(f) Structure unit of kidney

Sol. I(iii) Nephron (f) Structural unit of kidney.

(iv) Endocrine Gland (d) Hormone

(v) Homologous organ (a) Our arm & a dog's foreleg.

Sol. (i) (c)

4. Write the answers in one sentence each. **1 × 5 = 5 Marks**

(i) What is the pH value of pure water?

(ii) Write the name of pigment found in leaf of green plants.

Ans. Chlorophyll is the pigment found in leaf of a green plant.

(iii) Which disease is found in human due to the deficiency of iodine?

Ans.Goitre is the disease that occurs due to deficiency of iodine.

(iv) Write the names of two fossil fuels

Ans.Coal and petroleum, are two fossil fuels.

(v) Write mirror formula

Ans. $\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$

Sol. (i) 7

5. Define rancidity **2 Marks**

OR

Why do we apply paint on iron articles?

Sol. Rancidity: When the food materials prepared in fats and oils are kept for a long time, they start giving unpleasant smell and taste, this is called rancidity.

This happens as follows : When the fats and oils present in food materials get oxidised by the oxygen (of air), their oxidation products have unpleasant smell and taste.The condition produced by aerial oxidation of fats and oils in foods marked by unpleasant smell and taste is called rancidity

OR

When an iron article remains exposed to moist air for a long time, its surface is covered with a brown, flaky (non-sticky) substance called rust.

To prevent rusting. iron articles are not allowed to come in contact with the damp air. This can be done by painting the iron articles.

6. Define valency **2 Marks**

OR

Write the two limitations of Newland's law of octaves.

Sol. Valency of an element is the combining capacity of the atoms of the element with atoms of the same or different elements. The combining capacity is explained in terms of their tendency to attain a fully - filled outermost shell

OR

Limitations of law of octaves :

(A) The law of octaves was found to be applicable only upto calcium. It was not applicable to elements of higher atomic masses.

(B) Position of hydrogen along with fluorine and chlorine was not justified on the basis of chemical properties.

7. What is pollination? **2 Marks**

Sol. The transfer and deposition of pollen grains from the anther to the stigma of a flower is called as pollination. Pollination is of two types :-

(i) Self pollination :- The transfer of the pollen grains from the anther to the stigma of either the same or genetically similar flower.

(ii) Cross pollination : The transfer of the pollen grains from the anther of one flower to the stigma of another flower on a different plant of the same species.

OR

How does binary fission differ from multiple fission ?

Sol.

Binary fission	**Multiple fission**
–Asexual reproduction where each nuclear division is followed by cytoplasmic division.	–Asexual reproduction where the nucleus divided several times before the cytoplasmic division.
–Two daughter cells are formed **e.g.** Amoeba	Many daughter cells are formed **e.g.** Plasmodium

8. What is fossils? **2 Marks**

Sol. –Fossils are the remains or impression of a pre-historic plant or animal embedded in rock and preserved in petrified from.

–The study of fossils of some of the organisms show similarity between the two groups.

OR

Define homologous organ.

Sol. –Homology refers to the traits inherited by two different organisms from a common ancestry.

–Homologous organs are those organs which are similar in structure and different in function.

–These organs have similar origin & different function.

e.g.(i) Forelimbs of vertebrates having pentadactyl limbs of similar origin and similar arrangement of bones. Muscles etc.

9. Define the centre of curvature of the spherical mirror? **2 Marks**

OR

Define the principal focus of a concave mirror.

Sol. **Centre of curvature (C) :** The centre of the sphere of which the mirror is a part is called centre of curvature.

OR

A parallel beam of light after reflection from a concave mirror converges at a point in front of the mirror. This point (F) is the focus of a concave mirror and it is real.

10. Define exothermic reaction and endothermic reaction with example. **2 Marks**

OR

Define displacement and double displacements reaction with example

Sol. **Endothermic reaction :** A chemical reaction which is accompanied by the absorption of energy is called an endothermic reaction.

- $C(s) + 2S(s) \xrightarrow{Heat} CS_2(\ell)$

Exothermic reaction : A chemical reaction which is accompanied by the release of energy is called exothermic reaction.

• When quick lime (calcium oxide) is placed in water, the water becomes very hot and sometimes starts boiling. It is because of release of heat energy during the reaction.

$$\underset{\text{Calcium oxide}}{CaO(s)} + \underset{\text{Water}}{H_2O(l)} \longrightarrow \underset{\text{Calcium hydroxide}}{Ca(OH)_2\,(aq)} + \text{Heat energy}$$

OR

Displacement reaction : It involves displacement of one of the constituents of a compound by another substance and may be regarded as a displacement reaction.

$$\underset{\text{Zinc}}{Zn(s)} + \underset{\text{Sulphuric acid}}{H_2SO_4(aq)} \longrightarrow \underset{\text{Zinc sulphate}}{Zn\,SO_4\,(aq)} + \underset{\text{Hydrogen}}{H_2\,(g)}$$

Double Displacement :

It is mutual exchange of the radicals of two compounds taking part in the reaction and results in the formation of two new compounds.

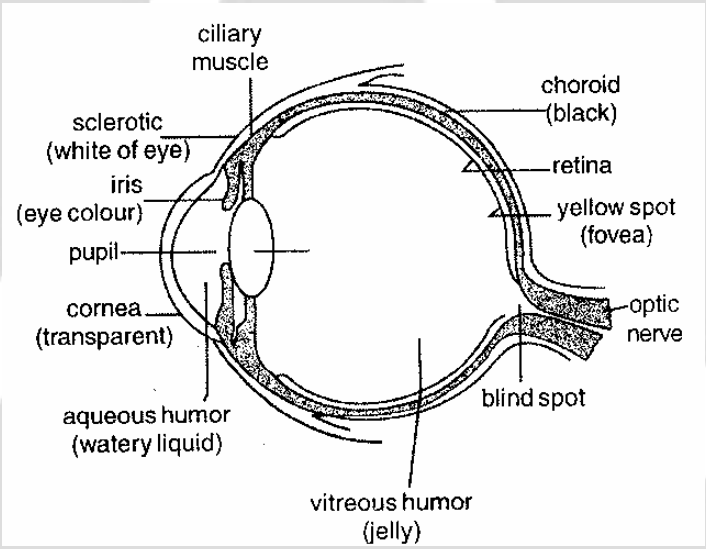
• $NaCl(aq) + AgNO_3(aq) \longrightarrow AgCl\downarrow + NaNO_3(aq)$

11. Draw a well labelled diagram of human eye. **3 Marks**

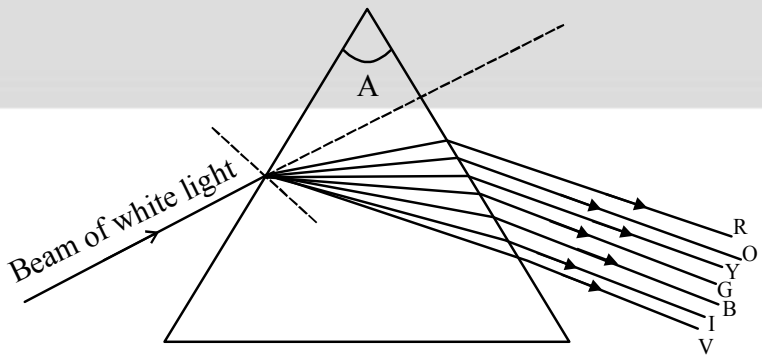
OR

Draw a diagram of dispersion of white light by the glass prism.

Sol.



OR



12. Write any three properties of magnetic field lines. **3 Marks**

OR

State fleming's left - hand rule

Sol. **Properties of Magnetic field lines :**

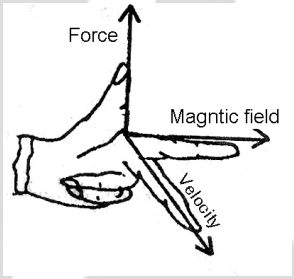
(I) They form closed continuous curves. They repel each other and are in a state of tension.

(II) Externally, they move from north pole of a magnet to its south pole.

(III) Inside the magnet they move from south pole to north pole.

OR

Fleming's left hand rule : If we stretch the forefinger, middle finger and the thumb of our left hand in such a way that mutually perpendicular to each other as shown in figure the forefinger indicates the direction of the magnetic field and the middle finger is in the direction of velocity of the charge partical, then lorentz force will act in the direction of thumb. (for positive charge)

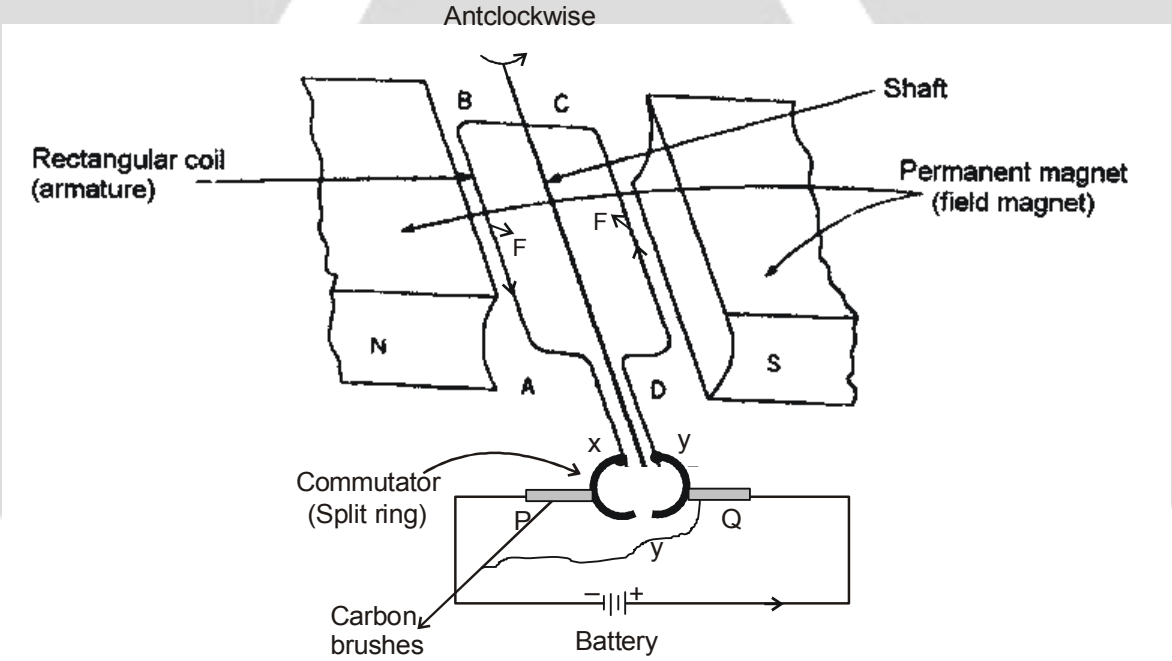


13. Draw a well labelled diagram of electric motor **3 Marks**

OR

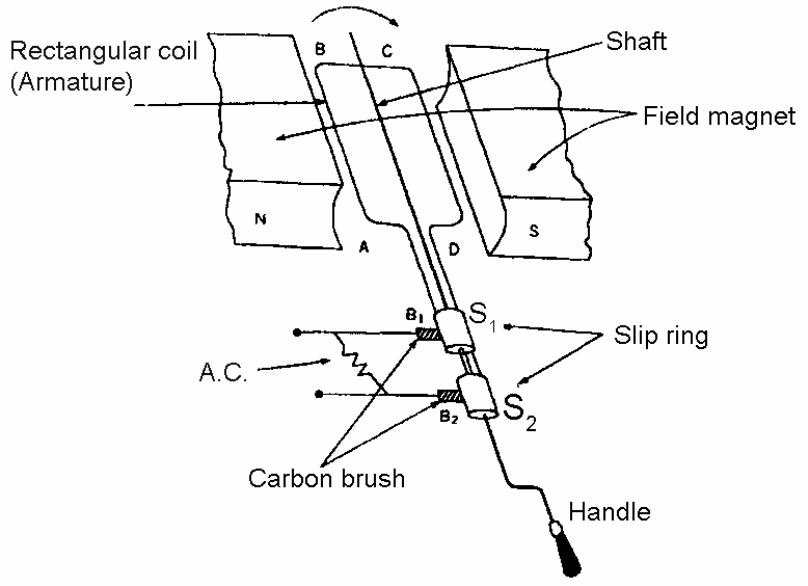
Draw a well labelled diagram of electric generator.

Sol.



An electric motor

OR



14. Write the advantages of using a solar cooker, (any 3) **3 Marks**

OR

What are the qualities of an ideal sources of energy?

Sol. Advantages of using a solar cooker :
- They directly utilize solar energy
- They need no maintenance.
- They do not cause pollution.

OR

For a good source of energy, following conditions must be fullfilled by it:

(i) It should provide large amount of useful energy.

(ii) It must be easily storable in small space.

(iii) It must be easily transportable.

(iv) It must provide the energy in regular manner.

(v) It should be convenient to use

15. (a) Define neutralisation reaction with example **4 Marks**

(b) Write the chemical formula of following:

(i) Bleaching powder (ii) Plaster of Paris

OR

Write two important uses of washing soda and baking soda

Sol. (a) It may be defined as a reaction between acid and base present in aqueous solution to form salt and water.

$HCl(aq) + NaOH(aq) \longrightarrow NaCl(aq) + H_2O(\ell)$

(b) (i) $CaOCl_2$

(ii) $CaSO_4.\frac{1}{2}H_2O$

OR

Washing Soda

(i) It is used as cleansing agent for domestic purposes.

(ii) It is used in softening of hard water and controlling the pH of water.

Baking Soda

(i) It is used in the manufacture of baking powder. Baking powder is a mixture of potassium hydrogen tartarate and sodium bicarbonate. During the preparation of bread the evolution of carbon dioxide causes bread to rise (swell).

(ii) It is largely used in the treatment of acid spillage and in medicine as soda bicarbonate, which acts as an antacid.

16. (a) Draw the electron dot structure of following: **4 Marks**

(i) CH_4 (ii) CO_2

(b) Draw the structures for the following:

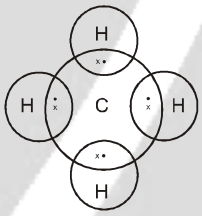
(i) Ethanoic acid (ii) Bromopentane

OR

(a) Write any two differences between soap and detergent.

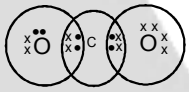
(b) Define the homologous series.

Sol. (a) **(i)**

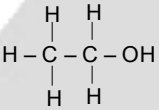


4 Shared electron pairs

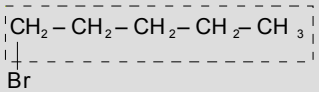
(ii)



(b) **(i)**



(ii)



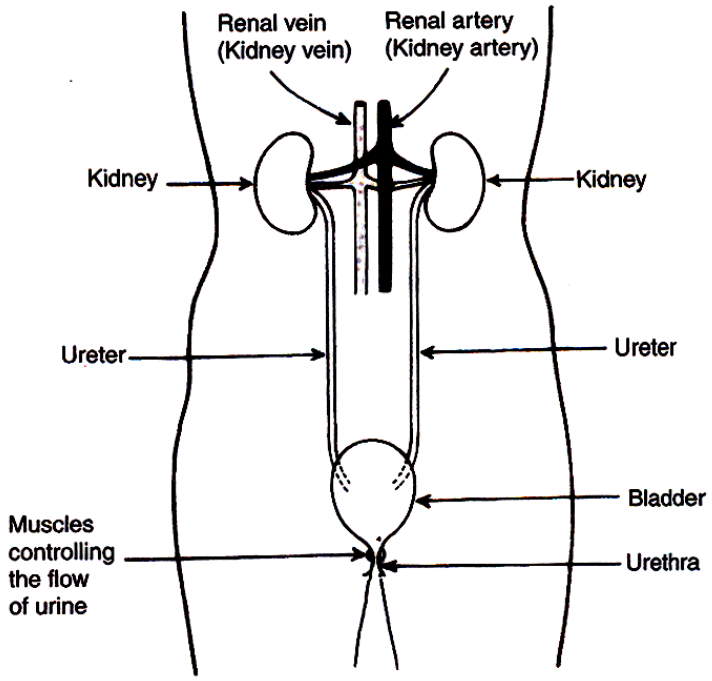
OR

(a)

S.No.	Soaps	Synthetic detergents
1	Soaps are sodium salts of higher fatty acids	Synthetic detergents are sodium alkyl sulphates or sodium alkyl benzene sulphonates with alkyl group having more than ten carbon atoms.
2	Soaps are prepared from natural oils and fats.	Synthetic detergents are prepared from the hydrocarbons of petroleum.

(b) Homologous series may be defined as a series of similarly constituted compounds in which the members possess similar chemical characteristics and the two consecutive members differ in their molecular formula by – CH_2.

17. Draw a well labelled diagram of human excretory system. **4 Marks**



The human excretory system (or urinary system).

OR

What are the different ways in which glucose is oxidised to provide energy in various organism?

Sol. There are two different ways in which glucose is oxidised to provide energy in various organism. They are aerobic and anaerobic.

In all cases first step is to break the 6 carbon molecule glucose into pyruvic acid in absence of oxygen . This process take place in cytoplasm.

$$\text{Glucose (6c)} \xrightarrow{\text{In cytoplasm}} \text{Pyruvic acid (3c)} \begin{cases} \xrightarrow{} \text{Aerobic} \\ \xrightarrow{} \text{Anaerobic} \end{cases}$$

(i) Aerobic $\rightarrow$food is oxidised to provide energy in presence of oxygen. In this process pyruvic acid is broken down into 3 molecules of carbon dioxide and water. This process occurs in mitochondria.

$$\underset{\text{Pyruvic acid}}{\underset{\text{acid}}{\text{Pyruvic}}} \xrightarrow[\text{Kreb cycle ETS.}]{\text{In presence of } O_2} CO_2+H_2O + 38\ ATP$$

It also releases energy in the form of ATP.

(ii) Anaerobic $\rightarrow$where oxidation of food takes place in absence of oxygen. It occurs in yeast where pyruvic acid is broken down to form 2 carbon molecules of ethanol and 2 molecule of carbon dioxide and 2 molecules of ATP (energy)

$$\text{Pyruvic acid} \longrightarrow 2C_2H_5OH + 2CO_2 + 2ATP.$$

18. Write the names and functions of four plant hormones. **4 Marks**

Sol. **Plant Hormones :** Are the growth regulators and important chemicals affecting growth of the plant.

–The growth regulators consists of :-

Four plant hormones are : -

1. Auxin :

Function :

1. Cell elongation and enlargement.
2. Apical dominance : The presence of terminal or apical bud results in the failure of lateral bud growth.
3. Parthenocarpy : Natural or artificial induced production of fruit without fertilization of ovule.

2. Gibberellins :

Function :

1. Cell Elongation.
2. Stem elongation : Induce stem elongation in genetically dwarf variety, called as Bolting effect.

3. Cytokinins :

Function :

1.Cell division.

2.Secondary growth : Cytokinins along with auxin promote secondary growth in plants that is increase thickness.

4.Ethylene :

Gaseous plant hormones .

–Autocatalytic in nature.

Function :

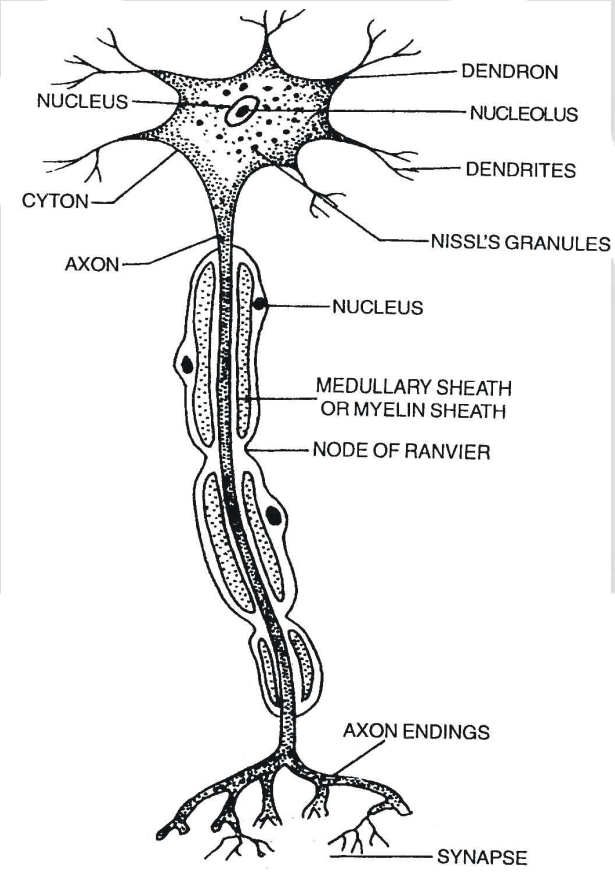
1.Fruit Ripening.

2.Accelerates the abscission of leaves and flowers.

OR

Draw a well labelled diagram of neuron (nerve cells)

Sol.



19. Write the conventional sysmbols of the following components used in electric circuit diagram- **4 Marks**

(a) An electric cell (b) A wire joint

(c) Electric bulb (d) Voltmeter

OR

(a) State Ohm's law.

(b) Define electric current and write its S.I. unit.

Sol. (a) Cell 

(b) A wire joint 

(c) Electric bulb 

(d) Voltmeter 

OR

(a) It states that the current passing through a conductor is directly proportional to the potential difference across its ends, provided the temperature and other physical conditions (mechanical strain etc.), remain unchanged i.e., $I \propto V$ or $V \propto I$ or $V = RI$

(b) The rate of flow electric charge from one body to another through a conductor such as metal wire is called electric current .

"OR"

The quantity of charge passing through a given point of the conductor in one second is called electric current.

Chemical Properties	Metals	Non-Metals
1. Nature of oxides	Metals form basic oxides, some are amphoteric also.	Non-metals form acidic or neutral oxides.
2. Displacement of hydrogen from acids	Metals displace hydrogen from acids and form salts.	Non-metals do not displace hydrogen from acids.
3. Reaction with chlorine	Metals react with Cl_2 to form electrovalent chlorides.	Non-metals react with Cl_2 to form covalent chlorides.

SI unit of current is ampere, which is denoted by letter A.

20. (a) Define the term- **2 Marks**

(i) Ore (ii) Gangue

(b) Differentiate between metal and non- metal on the basis of their chemical properties (any three). **3 Marks**

OR

(a) State two ways to prevent the rusting of iron

(b) Give reasons

(i) Platinum, gold and silver are used to make jewellery.

(ii) Ionic compounds have high melting points.

Sol. (a) **(i)** The natural substances in which metals or their compounds occur either in native state or combined state are called minerals.

(ii) The minerals are not pure and contain different types of other impurities. The impurities associated with minerals are collectively known as gangue or matrix.

(b)

OR

(a) **Methods to prevent rusting.**

(i) By greasing and oiling the iron articles such as mechanical tools, machine parts etc.

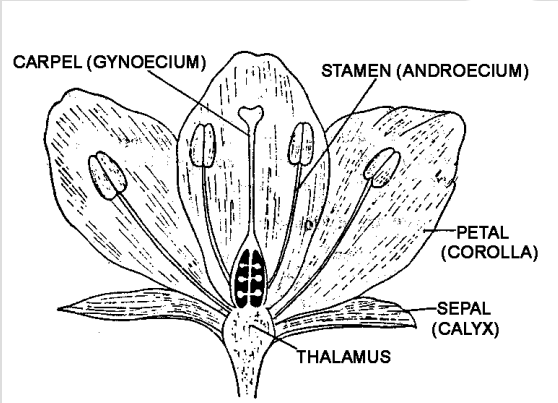
(ii) By galvanisation, i.e. coating the surface of iron objects with a thin layer of zinc.

(b) (i) these metals are shining, lusturous metal, they are highly malleable and ductile. So they are used for making jewellery.

(ii) Strong electrostatic force of attraction is present between ions of opposite charges. To break the crystal lattice more energy is required so their melting points and boiling points are high.

21. Draw a labelled diagram of the longitudinal section of flower. **5 Marks**

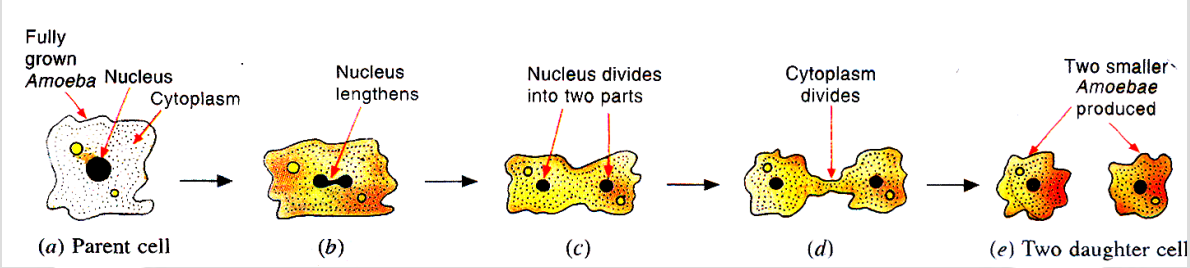
Sol.



OR

(a) Draw in sequence, different stages of binary fission in amoeba,

Sol.



(b) What is vegetative propagation?

Sol. **Vegetative propagation :**

This is a type of reproduction found in higher plants in which a new plant is formed from a vegetative part of the plant such as roots, stems or leaves for eg. in potato, bryophyllum, sweet potato etc.

- Vegetative propagation occurs through leaf in *Bryophyllum.*

22. (a) Write the law of reflection. **5 Marks**

(b) Find the focal length of a lens of power - 2.0 D. What type of lens is this?

OR

(a) Draw a ray diagram of refraction of light through a rectangular glass slab.

(b) Write any three uses of concave mirror

Sol. (a) The reflection of light from a surface obeys certain laws called laws of reflection. They are:

(i) Angle of Incidence is equal to the angle of reflection, i.e., $\angle i = \angle r$.

(ii) Incident ray, reflected ray and normal to the reflecting surface always lie in the same plane

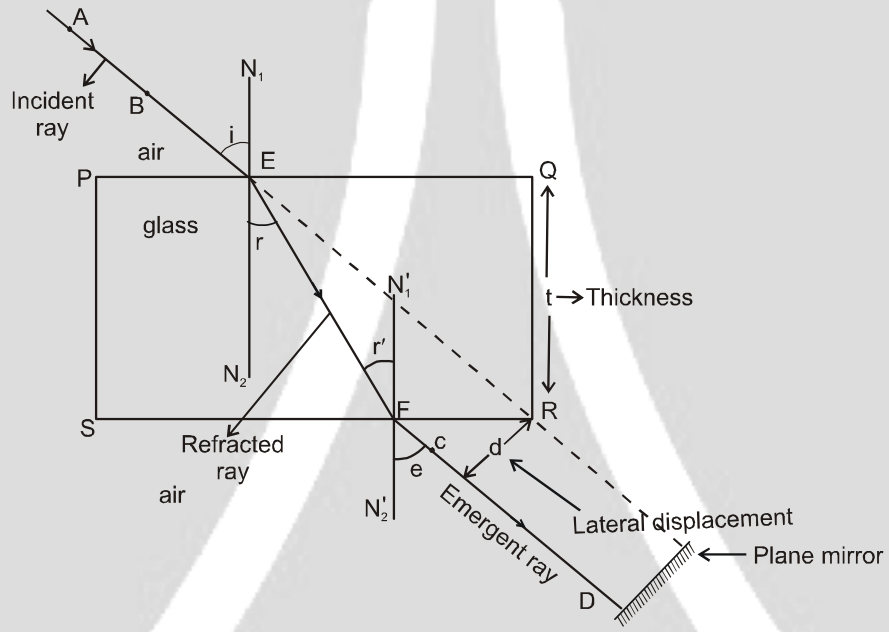
(b) $P = \frac{1}{f}$

$$f = \frac{1}{P} = \frac{-1}{2} = -\ 0.5\ \ m$$

Lens is concave.

OR

(a)



(b) **Uses of concave mirror :**

(i) They are used as shaving mirrors.

(ii) They are used as reflectors in car head-lights, search lights, torches and table lamps.

(iii) They are used by doctors to concentrate light on body parts like ears and eyes which are to be examined.