

Std. : 10

Sub. : Science

# QUESTION PAPER-2

(Annual Examination)

Duration : 3 hour

Total Marks : 80

Student's Name : .....

Batch No. ....

Roll No. ....

Date ..... / ..... / 20.....

Marks  
Obtained

## SECTION-A

Do as directed. (Que. 1 to 24) (each carries 1 mark) [24]

Choose the correct alternative and write the answer.

1. Calcium phosphate is present in tooth enamel. Its nature is  
(Ch.2)

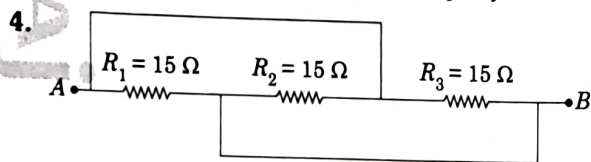
- (A) basic
- (B) acidic
- (C) neutral
- (D) amphoteric

2. Which of the following does not belong to the same homologous series ?  
(Ch.4)

- (A) CH<sub>4</sub>
- (B) C<sub>2</sub>H<sub>6</sub>
- (C) C<sub>3</sub>H<sub>8</sub>
- (D) C<sub>4</sub>H<sub>8</sub>

3. In which organ the exchange of respiratory gases take place ?  
(Ch.5)

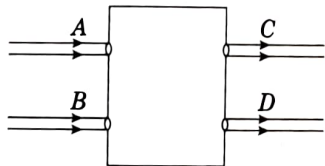
- (A) Trachea
- (B) Alveoli
- (C) Larynx
- (D) Nasopharynx



For above network, equivalent resistance between points A and B is \_\_\_\_\_  
(Ch.11)

- (A) 45  $\Omega$
- (B) 15  $\Omega$
- (C) 5  $\Omega$
- (D) 22.5  $\Omega$

5. As shown in the figure, light beams enter the box through holes A and B which come out of box from C and D. Then what must have been present in the box ?  
(Ch.9)



- (A) rectangular glass box
- (B) convex lens
- (C) concave lens
- (D) prism

6. Eye-lens is \_\_\_\_\_  
(Ch.10)

- (A) concave lens
- (B) convex mirror
- (C) convex lens
- (D) concave mirror

Fill in the blanks by choosing the correct option from the bracket.

7. In \_\_\_\_\_ compounds - OH is the functional group.  
(Butanoic, Butanol, Butanone)  
(Ch.4)

8. \_\_\_\_\_ wire has red coloured insulation in household wiring. (Positive, Negative, Earthing)  
(Ch.12)

9. The opening and closing of stomatal pores is controlled by \_\_\_\_\_. (Phagocytes, Guard cells, Mast cells)  
(Ch.5)

10. The anther contains \_\_\_\_\_.  
(a sepals, ovules, pollen grains)  
(Ch.7)

11. Speed of light in vacuum is \_\_\_\_\_ m/s.  
( $0.3 \times 10^8$ ,  $3 \times 10^8$ ,  $3 \times 10^{-8}$ )  
(Ch.9)

12. Silver articles become black on prolonged exposure to air. This is due to the formation of \_\_\_\_\_.  
(Ag<sub>2</sub>S, Ag<sub>3</sub>N, Ag<sub>3</sub>O)  
(Ch.3)

State whether the following statements are True or False.

13. Reactivity of Al decreases if it is deeped in HNO<sub>3</sub>  
(Ch.3)

14. An individual can pass on to its progeny the experiences of its lifetime.  
(Ch.8)

15. While seeing nearby objects through hypermetropic eye, image falls on backside of retina.  
(Ch.10)

16. Vanilla is not an olfactory indicator.  
(Ch.2)

Answer in short.

17. Name the gland present in the brain.  
(Ch.6)

18. Name one variation in humans connected with ears.  
(Ch.8)

19. What are ciliary muscles ?  
(Ch.10)

20. In which type of connection of resistors, current passing through each resistor is same ?  
(Ch.11)

Match the following  
(Ch.13, 6)

	'A'	'B'
21.	Sulphur bacteria	(a) Autotrophic nutrition
22.	Snake	(b) Nondegradable waste
		(c) Consumers

	'A'	'B'
23.	Cytokinin	(a) Colouring test in lemon
24.	Ethylene	(b) Divarb corn test
		(c) Cell division test in plant

**SECTION - B**

➤ Answer any 9 questions from question no. 25 to 37 in about 40 to 50 words as asked.

(each carries 2 marks)

[18]

25. Which among the following are physical or chemical changes ?
- Evaporation of petrol
  - Burning of liquefied petroleum gas
  - Curdling of milk
  - Heating of an iron rod to red hot
  - Sublimation of solid ammonium chloride. (Ch.1)
26. What are amphoteric oxides? Give two examples of amphoteric oxides. (Ch.3)
27. Explain the importance of mucus in digestive system. (Ch.5)
28. State four types of asexual reproduction. (Ch.7)
29. Why is variation beneficial to the species but not necessarily for the individual ? (Ch.7)
30. What is caused by damage or malfunction of any part of our visual system ? (Ch.10)
31. A current of 0.5 A is drawn by a filament of an electric bulb for 10 minutes. Find the amount of electric charge that flows through the circuit. (Ch.11)
32. Draw a schematic diagram of a circuit consisting of a battery of three cells of 2 V each, a 5  $\Omega$  resistor, an 8  $\Omega$  resistor, and a 12  $\Omega$  resistor, and a plug key, all connected in series. (Ch.11)
33. Draw the diagram of an electromagnet. (Ch.12)
34. What could be the components of the garden ecosystem ? (Ch.13)
35. If all the waste we generate is biodegradable, will this have no impact on the environment ? (Ch.13)
36. State the route of respiratory gases in the human body. (Ch.5)
37. Explain about heating effect of electric current. (Ch.11)

**SECTION - C**

➤ Answer any 6 questions from question no. 38 to 46 in about 60 to 80 words as asked.

(each carries 3 marks)

[18]

38. What is combination reaction ? Explain it with examples. (Ch.1)
39. Write a note on - "Properties of ionic compound." (Here we don't need to describe the experiment but need to give detailed explanation of their properties.) (Ch.3)

40. (a) Given below are the steps for extraction of copper from its ore. Write the reaction involved.
- Roasting of copper (I) sulphide.
  - Reduction of copper (I) oxide with copper (I) sulphide.
  - Electrolytic refining.
- (b) Draw a neat and well labelled diagram for electrolytic refining of copper. (Ch.3)
41. Explain Reflex action in detail. (Ch.6)
42. Fragmentation is the mode of reproduction of multicellular organism. Explain. (Ch.7)
43. Explain Vegetative Propagation in detail. (Ch.7)
44. What is called a spherical mirror ? Describe its two types with proper diagrams. (Ch.9)
45. Using proper ray diagram, explain formation of image, formed by convex mirror for an object placed at (i) infinite distance (practically very far) and at (ii) finite distance from the mirror. Also summarise the results in the form of a table showing position, size and nature of image. (Ch.9)
46. Define potential difference. Mention its SI unit and give its definition also. (Ch.11)

**SECTION - D**

➤ Answer any 5 questions from question no. 47 to 54 in about 90 to 120 words as asked.

(each carries 4 marks)

[20]

47. When zinc metal is treated with dilute HCl or dil H<sub>2</sub>SO<sub>4</sub>, hydrogen gas is evolved, but with dilute HNO<sub>3</sub>, hydrogen gas is not evolved. Explain. (Ch.2)
48. (a) Why should curd and sour substances not be kept in brass and copper vessels?
- (b) Which gas is usually liberated when an acid reacts with a metal? Illustrate with an example. How will you test for the presence of this gas? (Ch.2)
49. Explain covalent bonding in hydrogen molecule (H<sub>2</sub>). (Ch.4)
50. Define Heterotrophic Nutrition and explain its types in detail. (Ch.5)
51. Describe the human digestive organs. (Ch.5)
52. Write a short note on "Myopia". (Ch.10)
53. What is called a solenoid ? Describe about magnetic field of a current carrying solenoid. (Ch.12)
54. Explain the flow of energy in the ecosystem (Ch.13)



# SCIENCE | QUESTION PAPER - 2 | FULL SOLUTION

## SECTION - A

→ Do as directed. (Que. 1 to 24) (each carries 1 mark) [24]

• Choose the correct alternative and write the answer.

(1) Calcium phosphate is present in tooth enamel. Its nature is \_\_\_\_\_ (Ch.2)

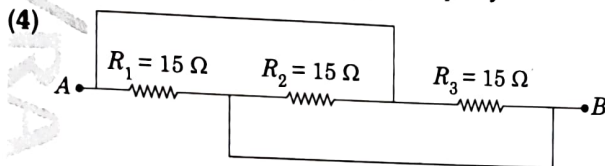
- (A) basic (B) acidic  
(C) neutral (D) amphoteric

(2) Which of the following does not belong to the same homologous series ? (Ch.4)

- (A)  $\text{CH}_4$  (B)  $\text{C}_2\text{H}_6$  (C)  $\text{C}_3\text{H}_8$  (D)  $\text{C}_4\text{H}_8$

(3) In which organ the exchange of respiratory gases take place ? (Ch.5)

- (A) Trachea (B) Alveoli  
(C) Larynx (D) Nasopharynx

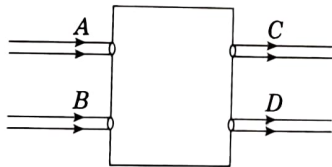


For above network, equivalent resistance between points A and B is \_\_\_\_\_ (Ch.11)

- (A)  $45 \Omega$  (B)  $15 \Omega$  (C)  $5 \Omega$  (D)  $22.5 \Omega$

(5) As shown in the figure, light beams enter the box through holes A and B which come out of box from C and D.

Then what must have been present in the box ? (Ch.9)



- (A) rectangular glass box (B) convex lens  
(C) concave lens (D) prism

(6) Eye-lens is \_\_\_\_\_. (Ch.10)

- (A) concave lens (B) convex mirror  
(C) convex lens (D) concave mirror

• Fill in the blanks by choosing the correct option from the bracket.

(7) In Butanol compounds - OH is the functional group.

- (Butanoic, Butanol, Butanone) (Ch.4)

(8) Positive wire has red coloured insulation in household wiring. (Positive, Negative, Earthing) (Ch.12)

(9) The opening and closing of stomatal pores is controlled by Guard cells.  
(Phagocytes, Guard cells, Mast cells) (Ch.5)

(10) The anther contains pollen grains.  
(a sepals, ovules, pollen grains) (Ch.7)

(11) Speed of light in vacuum is  $3 \times 10^8$  m/s.  
( $0.3 \times 10^8$ ,  $3 \times 10^8$ ,  $3 \times 10^{-8}$ ) (Ch.9)

(12) Silver articles become black on prolonged exposure to air. This is due to the formation of Ag<sub>2</sub>S.  
(Ag<sub>2</sub>S, Ag<sub>3</sub>N, Ag<sub>3</sub>O) (Ch.3)

• State whether the following statements are True or False.

(13) Reactivity of Al decreases if it is deeped in  $\text{HNO}_3$  (Ch.3)

(14) An individual can pass on to its progeny the experiences of its lifetime. (Ch.8)

(15) While seeing nearby objects through hypermetropic eye, image falls on backside of retina. (Ch.10)

(16) Vanilla is not an olfactory indicator. (Ch.2)

Ans. 13. True 14. False 15. True 16. False

• Answer in short.

(17) Name the gland present in the brain. (Ch.6)

Ans. The glands present in the brain are pituitary gland, hypothalamus and pineal gland.

(18) Name one variation in humans connected with ears. (Ch.8)

Ans. Some humans have attached earlobes while some have few earlobes which is due to variation in genes.

(19) What are ciliary muscles ? (Ch.10)

Ans. Muscles in our eye-ball which hold eye lens and which can adjust its focal length by modifying curvature of eye lens are called ciliary muscles.

(20) In which type of connection of resistors, current passing through each resistor is same ? (Ch.11)

Ans. series connection.

• Match the following (Ch.13, 6)

	'A'	'B'
(21)	Sulphur bacteria	(a) Autotrophic nutrition
(22)	Snake	(b) Nondegradable waste
		(c) Consumers

	'A'		'B'
(23)	Cytokinin	(a)	Colouring test in lemon
(24)	Ethylene	(b)	Divarb corn test
		(c)	Cell division test in plant

Ans. 21. (a)      22. (c)      23. (c)      24. (a)

### SECTION-B

➔ Answer any 9 questions from question no. 25 to 37 in about 40 to 50 words as asked.

(each carries 2 marks) [18]

(25) Which among the following are physical or chemical changes ?

- Evaporation of petrol
- Burning of liquefied petroleum gas
- Curdling of milk
- Heating of an iron rod to red hot
- Sublimation of solid ammonium chloride. (Ch.1)

Ans. (a) Evaporation of petrol is a physical change because no new chemical substance is formed.

(b) Burning of LPG is a chemical change because on burning LPG forms  $\text{CO}_2$  and  $\text{H}_2\text{O}$ .

(c) Curdling of milk is a chemical change because in the conversion of milk to curd, new chemical substances are formed.

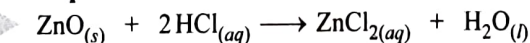
(d) Heating of an iron rod to red hot is a physical change.

(e) It is a physical change, because solid  $\text{NH}_4\text{Cl}$  Vapours and no new chemical substance is formed.

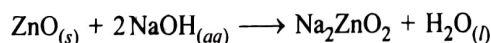
(26) What are amphoteric oxides? Give two examples of amphoteric oxides. (Ch.3)

Ans. The oxides which behave as acid as well as base are called amphoteric oxides.

Example :



Zinc oxide    Hydrochloric    Zinc  
as base      acid            chloride



Zinc oxide    Sodium            Sodium  
as acid      hydroxide        zincate

(27) Explain the importance of mucus in digestive system. (Ch.5)

Ans. (1) Mucus present in saliva is useful in chewing, forming morsle and swallowing the food.

(2) Mucus present in the wall of stomach protects the stomach from acidic effect caused due to HCl and pepsin.

(3) Mucus present in the intestine helps in the transportation and absorption of food.

(4) It is also helpful in removing undigested particles from the anus.

(28) State four types of asexual reproduction. (Ch.7)

- Ans. (1) Binary fission      (2) Budding  
(3) Multiple fission      (4) Fragmentation.

(29) Why is variation beneficial to the species but not necessarily for the individual ? (Ch.7)

Ans. The variation found in different species give them the ability to survive in changing environment. If there is sudden change in the atmospheric conditions then some species might extinct. But some of them can live because of variation.

The one who lives can reproduce and produce new offsprings of there species and forms their new population. So we can say that variation is beneficial to the species but not necessarily for the individual.

(30) What is caused by damage or malfunction of any part of our visual system ? (Ch.10)

Ans. Damage or malfunction of any part of our visual system causes visual impairment (i.e. loss of sight partly or completely, unclear vision, defect of vision)

(31) A current of 0.5 A is drawn by a filament of an electric bulb for 10 minutes. Find the amount of electric charge that flows through the circuit. (Ch.11)

Ans. Here  $I = 0.5 \text{ A}$

$$t = 10 \text{ min} = 10 \times 60 \text{ s} = 600 \text{ s}$$

➔ Amount of electric charge is given by,

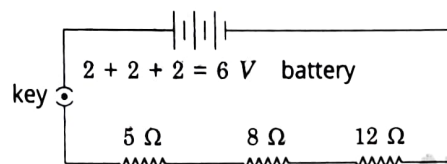
$$Q = It \quad \left( \because I = \frac{Q}{t} \right)$$

$$\therefore Q = (0.5) (600)$$

$$\therefore Q = 300 \text{ C}$$

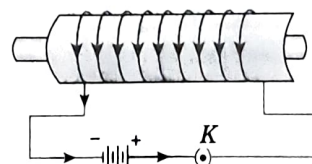
(32) Draw a schematic diagram of a circuit consisting of a battery of three cells of 2 V each, a 5  $\Omega$  resistor, an 8  $\Omega$  resistor, and a 12  $\Omega$  resistor, and a plug key, all connected in series. (Ch.11)

Ans.



(33) Draw the diagram of an electromagnet. (Ch.12)

Ans.





- Above is the diagram of an electromagnet with soft iron core.
- When key is made closed, circuit is completed and so current starts passing through the solenoid which quickly produces strong magnetic field inside the magnetic core. (At this time, end *P* behaves like magnetic north pole and end *Q* behaves like magnetic south pole.)
- When the key is made open, circuit is broken and so current stops flowing through the solenoid which quickly diminishes the magnetic field inside the magnetic core. Hence the solenoid does not behave like a magnet.
- Thus, above device behaves like a magnet as long as current passes through the solenoid.
- Such a temporary magnet is called an "electromagnet."

**(34) What could be the components of the garden ecosystem ?** (Ch.13)

**Ans.** ➤ There are grass, trees, ornamental plants like rose, mogra, sunflower in the garden. They are producers. There are also animals and consumers like insects, frogs, birds, rabbits, squirrel etc.

➤ Garden ecosystem is an example of artificial or man-made ecosystem.

**(35) If all the waste we generate is biodegradable, will this have no impact on the environment ?** (Ch.13)

**Ans.** Biodegradable wastes are decomposed by bacteria and fungi into simpler form which can be used by producers as raw materials. But all the waste becomes biodegradable then following problem can arise.

(1) Decomposition process is slow process, so accumulation of waste for too long will produce bad smell which can be harmful to man.

(2) Dumping of this waste can be breeding source of so many harmful microbes or insects.

**(36) State the route of respiratory gases in the human body.** (Ch.5)

**Ans.** External nostril → Nasal passage → Internal nostrils → pharynx → larynx → → trachea → bronchi → alveoli.

**(37) Explain about heating effect of electric current. (Ch.11)**

**Ans.** During the flow of electric current in a closed circuit, motion of electrons is continuously opposed by the resistance of the circuit. Hence, in order to maintain current in the circuit, cell or battery has to expend its energy. Now, question arises that where does this energy go ? Normally, some part of source energy is utilized in doing some useful work (like rotating the blades in a fan) and remaining energy is transformed into heat. If the circuit is purely resistive (i.e. source of energy is connected to only resistors) then source energy gets

dissipated entirely in the form of heat (for example in electric kettle, electric heater, electric iron etc.) This is known as "heating effect of electric current."

### SECTION - C

➤ Answer any 6 questions from question no. 38 to 46 in about 60 to 80 words as asked. (each carries 3 marks) [18]

**(38) What is combination reaction ? Explain it with examples.** (Ch.1)

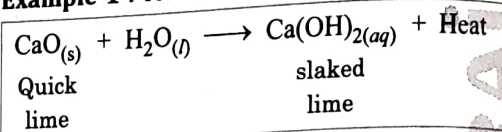
**Ans.** ➤ During a chemical reaction atoms of one element don't change in to another element.

➤ Chemical reactions involve the breaking and making of bonds between atoms to produce new substances.

• **Combination reaction**

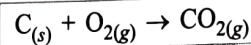
"A reaction in which a single product is formed from two or more reactants is known as a **combination reaction.**"

**Example 1 :** reaction between  $\text{CaO}$  and  $\text{H}_2\text{O}$ .

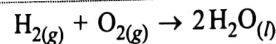


In this reaction calcium oxide and water combine to form a single product, calcium hydroxide. (which is called slaked lime. It is used to paint the walls)

**Example 2 :** Burning of coal.



**Example 3 :** Formation of water.



**(39) Write a note on - "Properties of ionic compound." (Here we don't need to describe the experiment but need to give detailed explanation of their properties.)** (Ch.3)

**Ans.** Properties of ionic compound can be explained as follows.

(1) **Physical nature**

➤ Ionic compounds are solids and are some what hard because of the strong force of attraction between the positive and negative ions.

➤ These compounds are generally brittle and break in to pieces when pressure is applied.

(2) **Melting point and Boiling Points.**

➤ Ionic compounds have **high M.P and B.P.** Because considerable amount of energy is required to break the strong inter - ionic attraction.

(3) **Solubility :**

➤ Electrovalent compounds are generally **Soluble in water** and insoluble in solvents such as kerosene and petrol.

**(4) Conduction of Electricity :**

- The conduction of electricity through a solution depends upon the movement of charged particles.
- A solution of an ionic compound in water contains ions, which move to the opposite electrodes when electricity is passed through the solution.
- Ionic compound in solid state **don't conduct electricity**, because **movement of ions** in the solid is not possible due to their rigid structure.
- Ionic compound in molten state conduct electricity. Because the electrostatic forces of attraction between the oppositely charged ions are overcome due to the heat.

Thus, the ions move freely and conduct electricity.

**(40) (a) Given below are the steps for extraction of copper from its ore. Write the reaction involved.**

- (i) Roasting of copper (I) sulphide.
- (ii) Reduction of copper (I) oxide with copper (I) sulphide.
- (iii) Electrolytic refining.

**(b) Draw a neat and well labelled diagram for electrolytic refining of copper. (Ch.3)**

**Ans. (a) (i)**  $2\text{Cu}_2\text{S}_{(s)} + 3\text{O}_{2(g)} \xrightarrow{\text{Heat}} 2\text{Cu}_2\text{O}_{(s)} + 2\text{SO}_{2(g)}$

**(ii)**  $2\text{Cu}_2\text{O}_{(s)} + \text{Cu}_2\text{S}_{(s)} \xrightarrow{\text{Heat}} 6\text{Cu}_{(s)} + \text{SO}_{2(g)}$

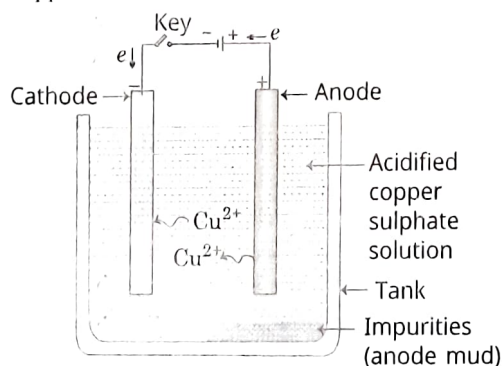
**(iii) Electrolytic refining**

1. A thick block of the impure metal has made anode (+ve).
2. A thin strip of pure metal has made cathode (-ve).
3.  $\text{CuSO}_4$  solution is taken as electrolyte.

At cathode :  $\text{Cu}^{2+}_{(aq)} + 2e^- \rightarrow \text{Cu}_{(s)}$

At anode :  $\text{Cu}_{(s)} \rightarrow \text{Cu}^{2+}_{(aq)} + 2e^-$

**(b) The diagram showing the electrolytic refining of copper.**

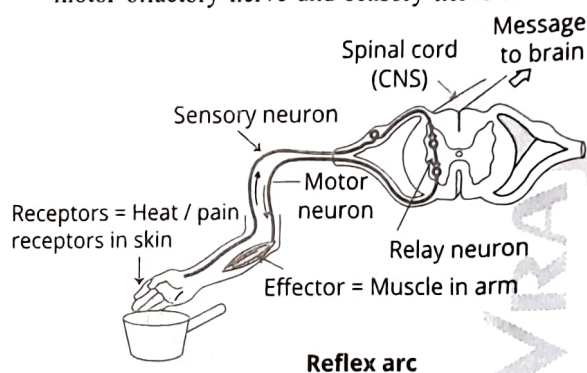


**(41) Explain Reflex action in detail. (Ch.6)**

**Ans.** Reflex action is such a situation in which, we do not think about but express an immediate response to

changes in the environment for eg : We move our hands immediately after touching the hot pan.

- In normal conditions any sensory impulse travel through the spinal cord to the brain which is protected in the skull. The brain thinks about it. In response it sends impulse to the muscle. The arm can be moved as the muscles contract. All these actions take a lot of time. Whereas, reflex action is very fast and it is carried out for protecting our body.
- In the above example the sensation of heat is received by the nerves. Nerves directly innervate the muscles. So this action is completed very quickly. Usually this type of structure is known as Reflex arc. Reflex arc is created in spinal cord, where the motor olfactory nerve and sensory nerve meet.



**Reflex arc**

- Animals have very little or none of the complex neuron network needed for thinking. So it is quite likely that reflex arcs have evolved as efficient ways of functioning in the absence of true thought processes. Even after complex neuron networks have come into existence, reflex arcs continue to be more efficient for quick responses.

**(42) Fragmentation is the mode of reproduction of multicellular organism. Explain. (Ch.7)**

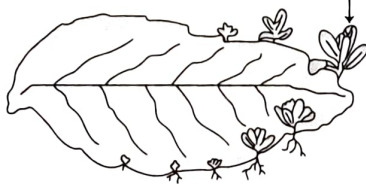
- Ans.**
- In multicellular organisms with relatively simple body organisation, simple reproductive methods can still work. Spirogyra for example simply breaks up into smaller pieces upon maturation. These pieces or fragments grow into new individuals.
  - This is not true for all multicellular organisms. They cannot simply divided cell by cell. The reason is that many multicellular organisms as we have seen are not simply a random collection of cell. Specialised cells are organised as tissues and tissues are organised into organs.
  - They have been placed at definite position in the body. In such a carefully organised situation, cell by cell division would be impractical. Multi-cellular organisms therefore need to use more complex ways of reproduction.



- A basic strategy used in multi-cellular organisms is that different cell types perform different specialised functions. Following this general pattern, reproduction in such organisms is also the function of a specific type.
- How is reproduction achieved from a single cell type, if the organism itself consists of many cell types? The answer is that there must be a single type in the organism that is capable of growing, proliferating and making other cell types under the right circumstances.

**(43) Explain Vegetative Propagation in detail. (Ch.7)**

- Ans.**
- There are many plants in which parts like the root, stem and leaves develop into new plants under appropriate conditions.
  - This property of vegetative propagation is used in methods such as layering or grafting to grow many plants like Sugarcane, roses or grapes for agricultural purposes.
  - Plants raised by vegetative propagation can bear flowers and fruits earlier than those produced from seeds. Such methods also make possible the propagation of plants such as banana, orange, rose and jasmine.
  - This type of vegetation loss the capacity to produce seeds.
  - Another advantage of vegetative propagation is that all plants produced are genetically similar enough to the parent plant to have all its characteristics.
  - Similarly buds produced in the notches along the leaf margin of *Bryophyllum* fall on the soil and develop into Buds

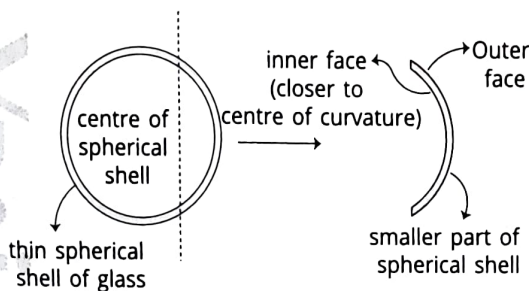


new plants. **Leaf of Bryophyllum with buds**

**(44) What is called a spherical mirror?**

Describe its two types with proper diagrams. (Ch.9)

**Ans.** When reflecting face of a mirror is made spherical, it is called a spherical mirror.



To prepare a spherical mirror, a thin spherical shell of glass is cut, parallel to any of its diameters. Then we separate the smaller part. Now if its inner face is made reflecting then we get a concave mirror and if its outer face is made reflecting then we get a convex mirror. See the figures given below.



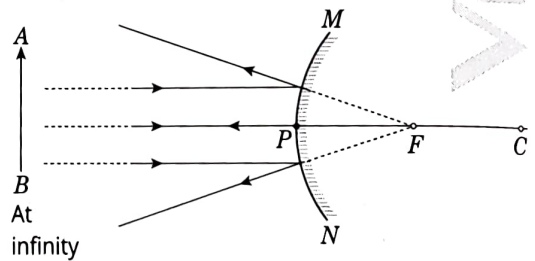
**(concave mirror)**

**(convex mirror)**

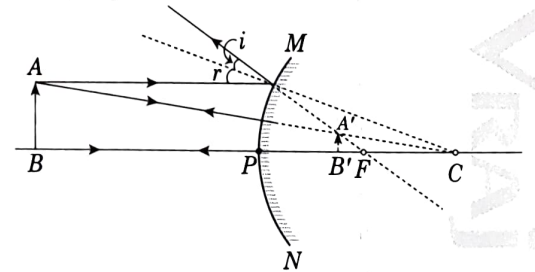
In above diagrams, backsides of both the mirrors are shown shaded which are non-reflecting. For a large shining spoon, its inner face can be treated nearly like a concave mirror whereas its outer face can be treated nearly like a convex mirror.

**(45) Using proper ray diagram, explain formation of image, formed by convex mirror for an object placed at (i) infinite distance (practically very far) and at (ii) finite distance from the mirror. Also summarise the results in the form of a table showing position, size and nature of image. (Ch.9)**

**Ans. (i) Object placed at infinite distance :**



**(ii) Object placed at finite distance :**



☉ Position, size and nature of image formed by a convex mirror.

Position of the object	Position of the image	Size of the image	Nature of the image
At infinity	At the focus F, behind the mirror	Highly diminished, point-sized	Virtual and erect
Between infinity and the pole P of the mirror	Between P and F, behind the mirror	Diminished	Virtual and erect

(46) Define potential difference. Mention its SI unit and give its definition also. (Ch.11)

Ans. Amount of work done in moving a unit positive charge from one point to another point in an electric circuit carrying some current is called electric potential difference between those two points.

► If  $W$  amount of electrical work is done in moving  $Q$  amount of positive charge between two points in an electric circuit carrying some current then by definition potential difference between those two points is given by :

$$V = \frac{W}{Q} \quad \dots (1)$$

► SI unit of electric potential difference

$$= \frac{\text{joule (J)}}{\text{coulomb (C)}} = \text{volt (V)}$$

► Above unit is named after Italian physicist, Alessandro Volta.

● Definition of one volt :

► When 1 J amount of electrical work is done in moving 1 C positive charge from one point to another point in an electric circuit carrying some current then electric potential difference between those two points is said to be 1 V.

### SECTION-D

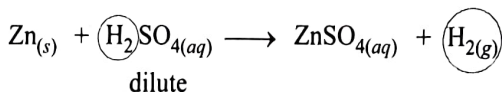
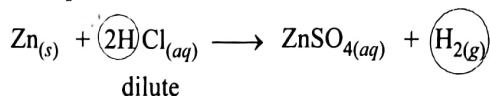
► Answer any 5 questions from question no. 47 to 54 in about 90 to 120 words as asked. (each carries 4 marks) [20]

(47) When zinc metal is treated with dilute HCl or dil  $H_2SO_4$ , hydrogen gas is evolved, but with dilute  $HNO_3$ , hydrogen gas is not evolved. Explain. (Ch.2)

Ans. ► Zinc metal reacts with dil. HCl and dil.  $H_2SO_4$  evolving  $H_2$  gas.

► Since Zn metal is more reactive than  $H_2$  gas, Zn can displace  $H_2$  gas from dil HCl and dil  $H_2SO_4$  solutions.

Example :



► But,  $H_2$  gas is not evolved by the reaction of Zn metal with dilute  $HNO_3$ , because  $HNO_3$  is a strong oxidising agent and  $H_2$  gas evolved during reaction is oxidised to  $H_2O$ .

► Therefore,  $H_2$  gas is not obtained during the reaction of Zn with  $HNO_3$ .

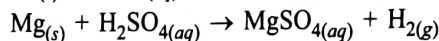
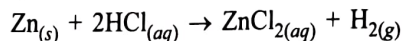
(48) (a) Why should curd and sour substances not be kept in brass and copper vessels?

(b) Which gas is usually liberated when an acid reacts with a metal? Illustrate with an example. How will you test for the presence of this gas? (Ch.2)

Ans. (a) Curd and sour substances should not be kept in brass and copper vessels because they possess acid which reacts with copper and brass and form their salts (poisonous substances)

These are naturally poisonous, which does food poisoning. So it is not advisable to keep sour substances like pickles and curd into brass and copper vessels.

(b) When metal reacts with acid, it produces  $H_2$  gas.



Test of  $H_2$  gas : To check the presence of  $H_2$  gas it is needed to pass it from soap solution.

► During this if burning candle is taken near the mouth of vessel then it burns with popping sound. so it can be said that it is a Hydrogen gas.

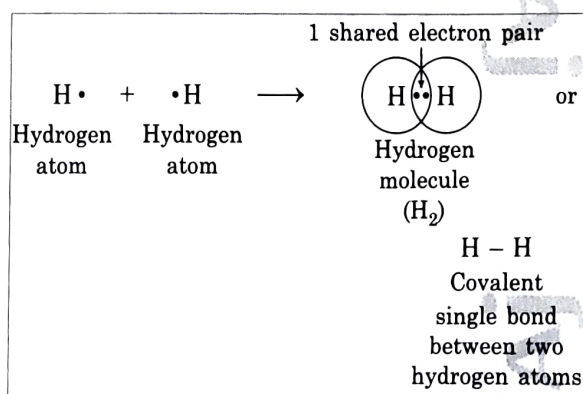
(49) Explain covalent bonding in hydrogen molecule ( $H_2$ ). (Ch.4)

Ans. ► The atomic number of hydrogen is 1. So, H-atom possess  $1e^-$ .

► H - atom requires 1 more electron to achieve the closed shell configuration of nearby inert element, helium.

► Hence, two H - atom, each having  $1e^-$ , will share their one electron by forming a covalent bond, and forms  $H_2$  - molecule.

► Both these atoms will attain dual closed shell configuration like that of helium.



► The electron pair that takes part in sharing is called bonding electron pair or bond electron pair.

► The single line between two hydrogen atoms represent single covalent bond.



(50) Define Heterotrophic Nutrition and explain its types in detail. (Ch.5)

Ans. The method of obtaining nutrition from organic matter sources is called Heterotrophic Nutrition. There are three types of it as follows :

(1) **Saprophytic Nutrition** : Organisms obtain nutrition from other dead organisms or decayed organic substance. They produce enzymes. Its releases enzymes outside the body and also digest the food outside the body. Digestion absorbs simple substance from it and takes it insides the body for eg. Mushroom, fungi, bacteria, yeast, bread mould.

(2) **Parasitic Nutrition** : In this type of nutrition organism obtain nutrition from other organism. Some organisms obtain nutrition by living in the body of other organisms called endoparasites. Some organisms obtain nutrition by living outside the body of other organisms. It is called ectoparasite for eg. Tapeworms, mosquitoes, round worms, cuscutta, lice, leeches, termites etc.

(3) **Holozoic Nutrition** : Normally this method of nutrition is found in all animals. It has several stages.

1. **Food ingestion** : The process of taking in food.

2. **Digestion** : The process of converting complex organic substance into simple organic substance with the help of enzymes.

3. **Absorption** : The act of absorbing digested simple organic substance in the body.

4. **Assimilation** : Storage of simple substances in the cell in various forms or the process of using the substance is known as Assimilation.

5. **Excretion** : The process of removing undigested food out of the body.

(51) Describe the human digestive organs. (Ch.5)

Ans. The various organs of human digestive system are as follows :

(1) Buccal cavity opens into the mouth. It contains teeth and tongue. It contains salivary glands. Digestion occurs through saliva.

(2) Mouth opens into oesophagus. Food moves further in the oesophagus through peristaltic movement.

(3) Oesophagus opens into stomach. The wall of the stomach contain gastric gland. Gastric juice converts the food into acidic medium for the digestion of food.

(4) Stomach opens into small intestine. The exit of food from the stomach is regulated by a sphincter muscle.

(5) It receives secretions of the liver in form of bile

juice and bile salts and from pancreas in form of pancreatic enzyme. It is the site for complete digestion of food.

(6) The walls of the intestine contains villi which absorbs digested food and increase the surface area for absorption. The villi are richly supplied with blood vessels.

(7) Small intestine opens into large intestine.

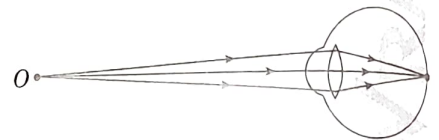
(8) Large intestine opens into anus. Water is absorbed into large intestine. The rest of the material is removed from the body via the anus. The exit of this waste material is regulated by the anal sphincter.

(52) Write a short note on "Myopia". (Ch.10)

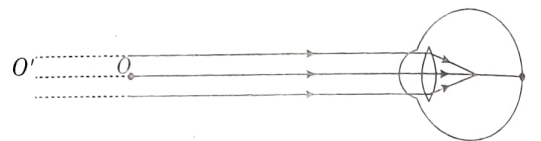
Ans. A person with myopia can see nearby objects (i.e. objects at short distances) clearly but can not see distant objects (i.e. objects at large distances) clearly.

➤ Myopia is also known as "near sightedness" or "short sightedness".

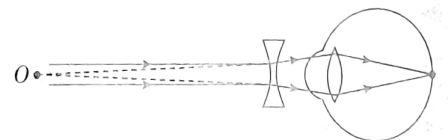
➤ Far point of a myopic person is not at infinity but shorter than that, somewhere at few metres, say at point  $O$  in fig. (a) given below.



(a) Far point of a myopic eye



(b) Myopic eye



(c) Correction for myopia

$O$  = Far point of a myopic eye

$O'$  = Far point of a normal eye

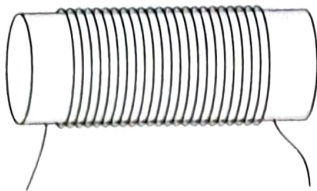
➤ In a myopic eye, image of distant object is formed in front of retina, as shown in fig. (b). Since image is not formed on the retina, distant object is not seen clearly by such eye.

➤ This defect arises due to (i) excessive curvature of eye-lens (with too short focal length) or (ii) bulky eyeball (elongated eyeball).

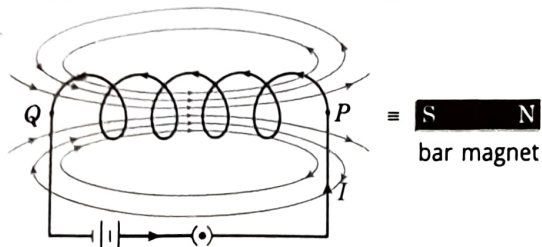
➤ This defect can be corrected by using concave lens of suitable power, as shown in fig. (c) where the image is brought back on the retina, to see the distant object clearly.

(53) What is called a solenoid ? Describe about magnetic field of a current carrying solenoid. (Ch.12)

Ans.



As shown in the figure, solenoid is a helical coil having closely wound circular turns of insulated conducting wire (usually copper wire). The region inside the solenoid is called "core". The core of a solenoid is either air or some magnetic material.



- ▶ When electric current is passed through solenoid (i.e. through its windings), we get magnetic field around it which is quite analogous (similar) to that around a bar magnet. Hence, we can say that a current carrying solenoid acts like a bar magnet.
- ▶ When length of a solenoid is extremely large as compared to radius of its cross - section, we consider it as a long solenoid.
- ▶ When current is passed through a long solenoid, majority magnetic field is produced only inside it. Hence outside such solenoid, magnetic field is almost zero.
- ▶ For extremely long current carrying solenoid, magnetic field exist inside it which is parallel to axis and uniform. Here magnetic field lines are parallel and equidistant from each other.

(54) Explain the flow of energy in the ecosystem (Ch.13)

- Ans. ▶ We know that, the food we eat acts as a fuel to provide us energy to do work. Thus the interactions among various components of the environment involves flow of energy from one component of the system to another. As we have studied, the autotrophs capture the energy present in sunlight and convert it into chemical energy. This energy supports all the activities of the living world.
- ▶ From autotrophs, the energy goes to the heterotrophs and decomposers. However, as we studied in the previous chapter on "Sources of Energy", when one form of energy is changed to another, some energy is lost to the environment in forms which cannot be used again. The flow of energy between various components of the environment has been extensively studied. Some of the conclusions are as follows :

- ▶ The green plants in a terrestrial ecosystem capture about 1 % of the energy of sunlight that falls on their leaves and convert it into food energy.
- ▶ When green plants are eaten by primary consumers, a great deal of energy is a lost as heat to the environment, some amount goes into digestion and in doing work and the rest goes towards growth and reproduction. An average of 10 % of the food eaten is turned into its own body and made available for the next level of consumers.
- ▶ Thus we can say that, 10 % can be taken as the average value for the amount of organic matter that is present at each step and reaches the next level of consumers. Little energy is available for the next level of consumers.

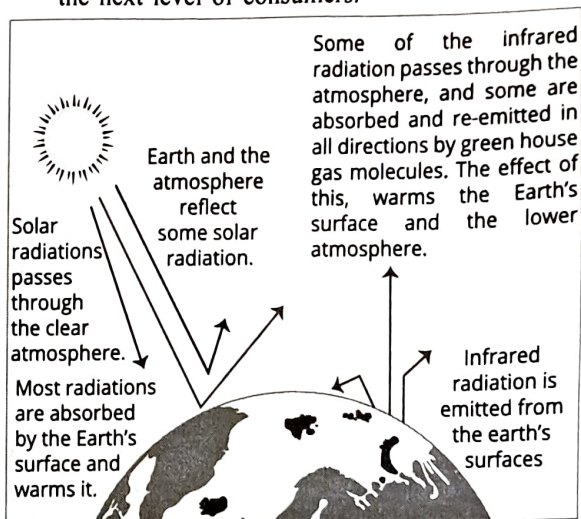
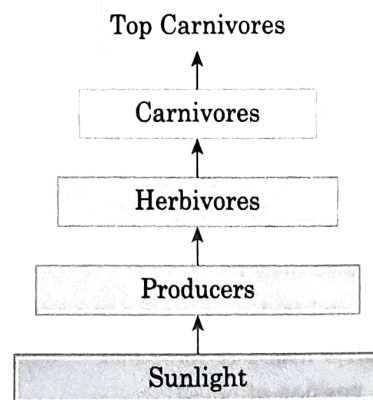


Diagram showing flow of energy in an ecosystem



- ▶ From the figure, two things become clear Firstly, the flow of energy is unidirectional. The energy that is captured by the autotrophs does not revert back to the solar input and the energy which passes to the herbivores does not come back to autotrophs. As it moves progressively through the various trophic levels it is no longer available to the previous level. Secondly, the energy available at each trophic level gets diminished progressively due to loss of energy at each level.