Aakash

Medical | IIT-JEE | Foundations

(Divisions of Aakash Educational Services Limited)

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Time : 3 Hrs.

Class X
Science
(CBSE 2019)

Max. Marks : 80

GENERAL INSTRUCTIONS :

(*i*)   The question paper comprises of five sections, **A, B, C, D** and **E**. You are to attempt all the sections.

(*ii*)   All questions are **compulsory**.

(*iii*)   Internal choice is given in sections **B, C, D** and **E**.

(*iv*)   Question numbers **1** and **2** in Section-**A** are one mark questions. They are to be answered in **one** word or in **one** sentence.

(*v*)   Question numbers **3** to **5** in Section **B** are two marks questions. These are to be answered in about **30** words each.

(*vi*)   Question numbers **6** to **15** in Section **C** are three marks questions. These are to be answered in about **50** words each.

(*vii*)   Question numbers **16** to **21** in Section **D** are five marks questions. These are to be answered in about **70** words each.

(*viii*)   Question numbers **22** to **27** in Section **E** are based on practical skills. Each question is a two marks question. These are to be answered in brief.

Section-A

1.   What is the function of a galvanometer in a circuit?   [1]

Sol.   To detect the presence of electric current in a circuit.   [1]

2.   Why is biogas considered an excellent fuel?   [1]

Sol.   (i)   It has high calorific value.   [½]

(ii)   It burns without smoke.   [½]

Section-B

3. How it can be proved that the basic structure of the Modern Periodic Table is based on the electronic configuration of atoms of different elements? **[2]**

OR

The electronic configuration of an element is 2, 8, 4. State its:

(a) group and period in the Modern Periodic Table.

(b) name and write its one physical property.

Sol. Electronic configuration is the distribution of electrons into shells of an atom. Elements, when arranged in order of increasing atomic number (number of electrons or protons), lead us to the classification known as the Modern Periodic Table.

The groups in the Periodic Table signify an identical outer-shell electronic configuration whereas the period indicates the number of shells in which electrons are filled. **[2]**

OR

(a) Group - 14 **[½]**

Period - 3 **[½]**

(b) Element with electronic configuration 2, 8, 4 is silicon. **[½]**

It is a metalloid because it exhibits properties of both metals and non-metals. **[½]**

4. Write two different ways in which glucose is oxidized to provide energy in human body. Write the products formed in each case. **[2]**

Sol. Following are the two different ways in which glucose is oxidized to provide energy in human body:

(i) **In presence of oxygen:**

$$\underset{\substack{(\text{6-carbon} \\ \text{molecule})}}{\text{Glucose}} \xrightarrow{\text{In cytoplasm}} \underset{\substack{(\text{3-carbon} \\ \text{molecule}) \\ + \\ \text{Energy}}}{\text{Pyruvate}} \xrightarrow{\text{In mitochondria}} \text{Carbon dioxide} + \text{Water} + \text{Energy}$$ **[1]**

(ii) **In lack of oxygen:**

$$\underset{\substack{(\text{6-carbon} \\ \text{molecule})}}{\text{Glucose}} \xrightarrow{\text{In cytoplasm}} \underset{\substack{(\text{3-carbon} \\ \text{molecule}) \\ + \\ \text{Energy}}}{\text{Pyruvate}} \xrightarrow{\text{In our muscle cells}} \underset{\substack{(\text{3-carbon} \\ \text{molecule})}}{\text{Lactic acid}} + \text{Energy}$$ **[1]**
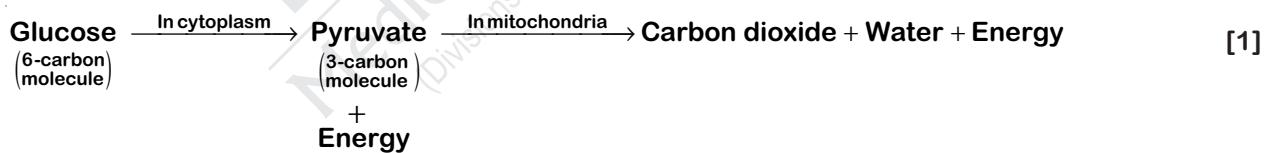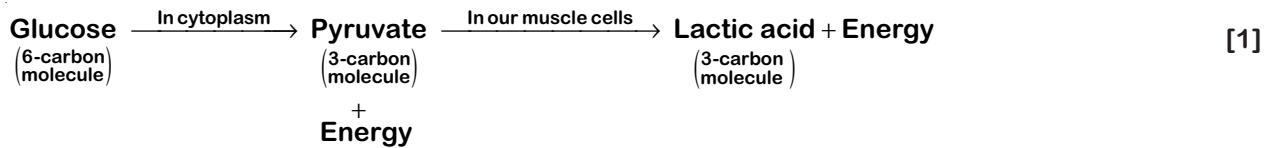
5. Define the term power of accommodation. Write the modification in the curvature of the eye lens which enables us to see the nearby objects clearly? **[2]**

Sol. The ability of an eye to see objects from infinity (far point) upto 25 cm (near point) is called power of accommodation. **[1]**

When we look at objects closer to eye, the ciliary muscles contract. This increases the curvature of eye lens. **[1]**

Section-C

6. 2 g of silver chloride is taken in a china dish and the china dish is placed in sunlight for sometime. What will be your observation in this case? Write the chemical reaction involved in the form of a balanced chemical equation. Identify the type of chemical reaction. **[3]**

OR

Identify the type of reactions taking place in each of the following cases and write the balanced chemical equation for the reactions.

(a) Zinc reacts with silver nitrate to produce zinc nitrate and silver.

(b) Potassium iodide reacts with lead nitrate to produce potassium nitrate and lead iodide.

Sol. **Observation** – White silver chloride turns grey in sunlight due to the decomposition of silver chloride into silver and chlorine. **[1]**

Chemical reaction – $2AgCl(s) \xrightarrow{\text{Sunlight}} 2Ag(s) + Cl_2(g)$ **[1]**
(Silver chloride) (Silver) (Chlorine)

Type of chemical reaction – Decomposition reaction **[1]**

OR

(a) $Zn(s) + 2AgNO_3(aq) \longrightarrow Zn(NO_3)_2(aq) + 2Ag(s)$ **[1]**
 (Zinc) (Silver nitrate) (Zinc nitrate) (Silver)
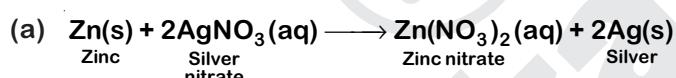
Type of reaction – Displacement reaction **[½]**

(b) $2KI(aq) + Pb(NO_3)_2(aq) \longrightarrow PbI_2(s) + 2KNO_3(aq)$ **[1]**
 (Potassium iodide) (Lead nitrate) (Lead iodide (Yellow ppt.)) (Potassium Nitrate)

Type of reaction – Double displacement reaction **[½]**

7. Identify the acid and the base from which sodium chloride is obtained. Which type of salt is it? When is it called rock salt? How is rock salt formed? **[3]**

Sol. The acid and the base from which sodium chloride is obtained are HCl and NaOH respectively. **[½+½]**
It is a neutral salt as pH of its aqueous solution is 7. **[½]**

Sodium chloride is also found in nature in solid form (large crystals). These large crystals are often brown due to impurities. This is called as rock salt. **[1]**

Beds of rock salt were formed when seas of bygone ages dried up. **[½]**

8. Based on the group valency of elements write the molecular formula of the following compounds giving justification for each : **[3]**

(i) Oxide of first group elements.

(ii) Halide of the elements of group thirteen, and

(iii) Compound formed when an element, A of group 2 combines with an element, B of group seventeen.

Sol. (i) Let first group elements be denoted by P

Symbol P O
Valency 1 2 **[½]**

Formula of oxide of P = P_2O **[½]**

(ii) Let elements of group thirteen be denoted by **Q** and halogens be denoted by **X**.

Symbol   Q   X
Valency   3   1   [½]

Formula of halide of Q = QX_3 [½]

(iii) Element   A   B   [½]
Valency   2   1

Formula of compound formed when an element, A of group 2 combines with an element, B of group seventeen = AB_2 [½]

9. Write three types of blood vessels. Give one important feature of each.   [3]

Sol. The three types of blood vessels are:

(a) Artery   [½]

(b) Vein   [½]

(c) Capillary   [½]

Features:

(a) Arteries are the vessels which carry blood away from the heart to various organs of the body. Since the blood emerges from the heart under high pressure, the arteries have thick, elastic walls.   [½]

(b) Veins collect the blood from different organs and bring it back to the heart. They do not need thick walls because the blood is no longer under pressure, instead they have valves that ensure that the blood flows only in one direction.   [½]

(c) Capillaries are the smallest vessels which have walls and are one-cell thick. Exchange of material between the blood and surrounding cells takes place across this thin wall.   [½]

10. Trace the sequence of events which occur when a bright light is focused on your eyes.   [3]

Sol. When a bright light focused on our eyes, then light first passes through the cornea and enters into the pupil, where size of pupil contracts which is controlled by iris. Hence less light enters the eye through the pupil. Then light passes through the eye lens and image is formed on the retina. The nature of image formed will be real and inverted.

11. What are plant hormones? Name the plant hormones responsible for the following ?   [3]

(i) Growth of stem

(ii) Promotion of cell division

(iii) Inhibition of growth

(iv) Elongation of cells

Sol. Plant hormones are the organic substances produced in small quantities, which regulate growth, development and other physiological functions.   [1]

The plant hormones responsible for the following are:

(i) Growth of stem - Auxin / Gibberellins

(ii) Promotion of cell division - Cytokinin

(iii) Inhibition of growth - Abscisic acid

(iv) Elongation of cells - Auxin   [4×½ = 2]

12. Name the plant Mendel used for his experiment. What type of progeny was obtained by Mendel in F_1 and F_2 generations when he crossed the tall and short plants? Write the ratio he obtained in F_2 generation plants. [3]

OR

List two difference between acquired traits and inherited traits by giving an example of each.

Sol. The plant Mendel used for his experiment was *Pisum sativum* (garden pea). [½]

Parents	–	Tall TT x Short tt	
Gametes	–	T t	
F_1 Generation	–	Tt (All tall offsprings)	[½]

Selfing of F_1 generation

Gametes	–	Tt x Tt
		T t T t

	♂ T	♂ t
♀ T	TT (Tall)	Tt (Tall)
♀ t	Tt (Tall)	tt (Short)

F_2 generation – [1]

F_2 Phenotypic ratio	–	Tall : Short 3 : 1	[½]
F_2 Genotypic ratio	–	TT : Tt : tt 1 : 2 : 1	[½]

OR

Differences between acquired traits and inherited traits : [3×1]

	Acquired traits	Inherited traits
1.	These traits are gained during the lifetime of an individual.	These traits are controlled by specific genes.
2.	These traits cannot be passed to the progeny.	These traits are passed on from one generation to another.
	Examples: Pierced earlobes	Examples: Colour of the eyes

13. What is a rainbow? Draw a labelled diagram to show the formation of a rainbow. [3]

Sol. Rainbow is a natural optical phenomenon caused by the dispersion of sunlight by tiny water droplet in the Earth's atmosphere. [1]
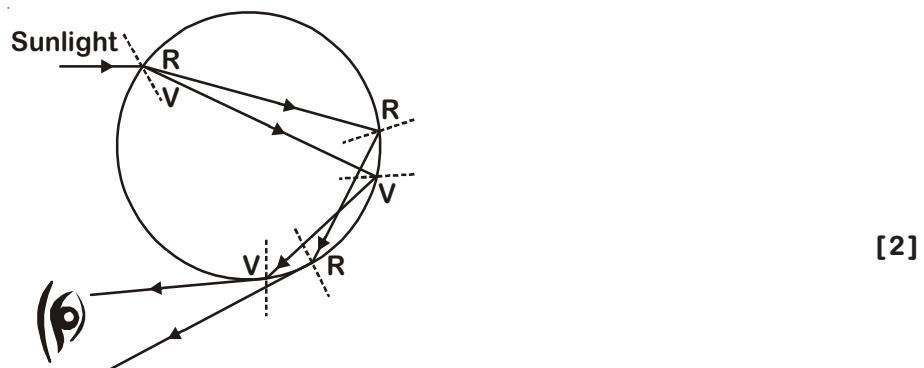
[2]

Fig. : Contribution of a single water droplet suspended in air in the formation of a rainbow

14. How can we help in reducing the problem of waste disposal? Suggest any three methods. **[3]**

OR

Define an ecosystem. Draw a block diagram to show the flow of energy in an ecosystem.

Sol. The problem of waste disposal can be reduced by the following ways:

(a) **Recycling :** Different kind of solid wastes like paper, plastics, etc., can be recycled. For example, waste paper is sent to the paper mills where it is reprocessed to produce new paper.

(b) **Composting :** Biodegradable domestic wastes such as left-over food, fruit and vegetable peels, leaves of potted plants, etc., can be converted into compost by burying them in a pit dug into ground.

(c) **Biogas and manure :** Organic wastes can also be decomposed anaerobically to yield biogas and manure.

(d) **Burning :** The solid combustible waste is burnt. It however, causes air pollution.

(e) **Sewage treatment plants (STPs) :** The dirty drain water containing urine and faeces, which is carried from our homes by underground pipes (called sewers) is called sewage. Sewage should always be disposed off by treating it in sewage treatment plants (STPs). The treatment results in the production of clean water, which is then discharged into river. **[Any three] [3 × 1]**

OR

All the interacting organisms in an area together with the non-living constituents of the environment form an ecosystem. Ecosystem consists of biotic and abiotic components. **[1]**
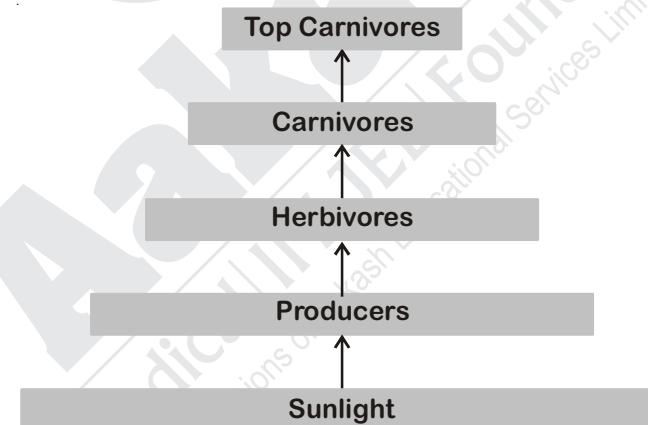
Block diagram showing flow of energy in an ecosystem **[2]**

15. What is water harvesting? List two main advantages associated with water harvesting at the community level. Write two causes for the failure of sustained availability of groundwater. **[3]**

Sol. Water harvesting means "capturing water". Capture, collection and storage of rain water and surface run off in a local area for filling either small water bodies or recharging ground water so that water continues to be available in non-rainy season is known as water harvesting. **[1]**

Advantages associated with water harvesting at community level are :

(a) It increases the production and income of the watershed community.

(b) It also mitigates droughts and floods.

(c) It increases the life of the downstream dams and reservoirs. **[Any two] [2×½=1]**

Causes for the failure of sustained availability of ground water are :

(a) Loss of vegetation cover.

(b) Diversion for high water demanding crops.

(c) Pollution from industrial effluents and urban wastes. **[Any two] [2×½=1]**

Section-D

16. (a) List in tabular form three chemical properties on the basis of which we can differentiate between a metal and a non-metal. **[5]**

    (b) Give reasons for the following :

        (i) Most metals conduct electricity well.

        (ii) The reaction of iron (III) oxide [Fe_2O_3] with heated aluminium is used to join cracked machine parts.

Sol. (a)

	Metal	Non-metal
(i)	Metal oxides are generally basic in nature.	Non-metallic oxides are generally acidic in nature.
(ii)	Metals generally react with water to produce hydrogen gas.	Non-metals generally do not react with water or steam.
(iii)	Metals are electropositive elements.	Non-metals are electronegative elements.

[1 × 3 = 3]

   (b) (i) Due to the presence of free electrons, most metals conduct electricity well. **[1]**

       (ii) When iron (III) oxide [Fe_2O_3] reacts with heated aluminium, the amount of heat evolved is so large that the metal produced is in molten state and thus used to join cracked machine parts. **[1]**

17. Write the chemical formula and name of the compound which is the active ingredient of all alcoholic drinks. List its two uses. Write chemical equation and name of the product formed when this compound reacts with **[5]**

    (i) sodium metal

    (ii) hot concentrated sulphuric acid

OR

What is methane? Draw its electron dot structure. Name the type of bonds formed in this compound. Why are such compounds :

(i) poor conductors of electricity? and

(ii) have low melting and boiling points? What happens when this compound burns in oxygen?

Sol. Chemical formula of the compound = C_2H_5OH **[½]**

Name of the compound = Ethanol **[½]**

Uses of ethanol :

(a) It is used as a solvent in tincture of iodine. **[½]**

(b) It is used as a solvent in cough syrups. **[½]**

(i) $$\underset{\text{Ethanol}}{2C_2H_5OH} + \underset{\text{Sodium}}{2Na} \longrightarrow \underset{\substack{\text{Sodium} \\ \text{ethoxide}}}{2C_2H_5ONa} + \underset{\text{Hydrogen}}{H_2}$$ **[1]**
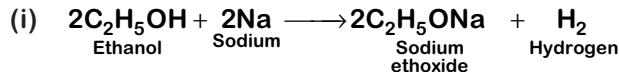
Name of the products formed = Sodium ethoxide and hydrogen **[½]**

(ii) $$\underset{\text{Ethanol}}{CH_3CH_2OH} \xrightarrow[443\,K]{\text{Hot conc. } H_2SO_4} \underset{\text{Ethene}}{CH_2=CH_2} + \underset{\text{Water}}{H_2O}$$ **[1]**
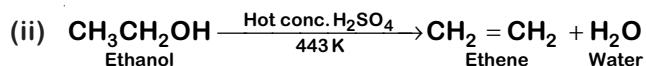
Name of the products formed = Ethene and water **[½]**

OR

Methane is a compound of carbon with chemical formula CH_4. **[½]**
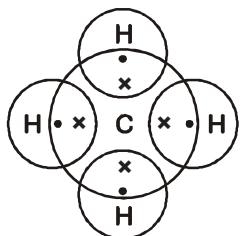
Electron dot structure
of methane **[1]**

Covalent bonds are formed in this compound. **[½]**

(i) In covalently bonded molecules, the electrons are shared between atoms and no charged particles are formed. Therefore, such compounds are generally poor conductors of electricity. **[1]**

(ii) Covalently bonded molecules are seen to have strong bonds within the molecule, but have weak inter-molecular forces. This gives rise to low melting and boiling points of these compounds. **[1]**

When methane burns in oxygen, CO_2, H_2O and a large amount of heat and light is released. **[1]**

18. Define pollination. Explain the different types of pollination. List two agents of pollination? How does suitable pollination lead to fertilization? **[5]**

OR

(a) Identify the given diagram, Name the parts 1 to 5.
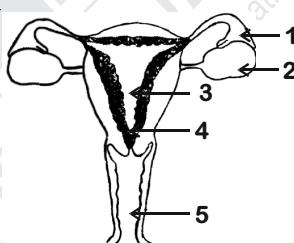
(b) What is contraception? List three advantages of adopting contraceptive measures.

Sol. The process of transfer and deposition of pollen grains from the anther to the stigma of the flower is called pollination. **[1]**

There are two different types of pollination :

(i) Self pollination : It is the process of transfer of pollen grains from the anther to the stigma of the same flower. **[1]**

(ii) Cross pollination : It is the process of transfer of the pollen grains from the anther of one flower to the stigma of another flower. **[1]**

Pollination can be achieved by the agents like wind, water and animals. **[Any two]** **[2×½=1]**

After the pollen lands on a suitable stigma, it has to reach the female germ-cells which are in the ovary. For this, a tube grows out of the pollen grain and travels through the style to reach the ovary and then fertilisation occurs. **[1]**

OR

(a)
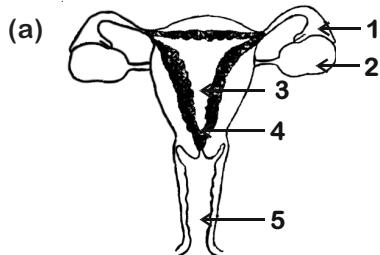
The above given diagram is of female reproductive system. [½]

1 - Fallopian tube

2 - Ovary

3 - Uterus

4 - Cervix

5 - Vagina [5×½=2½]

(b) The birth control methods which deliberately prevent fertilization are referred to as contraception. [½]

Advantages of adopting contraceptive measures are :

(i) It prevents unwanted pregnancy.

(ii) It prevents the transmission of STDs.

(iii) It controls the birth rate and determines the size of the population. [3×½=1½]

19. An object is placed at a distance of 60 cm from a concave lens of focal length 30 cm. [5]

(i) Use lens formula to find the distance of the image from the lens.

(ii) List four characteristics of the image (nature, position, size, erect/inverted) formed by the lens in this case.

(iii) Draw ray diagram to justify your answer of part (ii).

Sol. Given

$f = -30$ cm

$u = -60$ cm

$\therefore \quad \dfrac{1}{f} = \dfrac{1}{v} - \dfrac{1}{u}$ [½]

$\Rightarrow \quad \dfrac{1}{-30} = \dfrac{1}{v} - \dfrac{1}{-60}$

$\Rightarrow \quad \dfrac{1}{v} = -\dfrac{1}{30} - \dfrac{1}{60}$

$\Rightarrow \quad \dfrac{1}{v} = -\dfrac{3}{60}$

$\Rightarrow \quad v = -20$ cm [½]

| Nature	: Virtual	[½]
Position	: 20 cm from the lens, same side as the object	[½]
Size	: Diminished	[½]
Erect/Inverted	: Erect	[½]

Concave lens

⟵ 60 cm ⟶

[2]
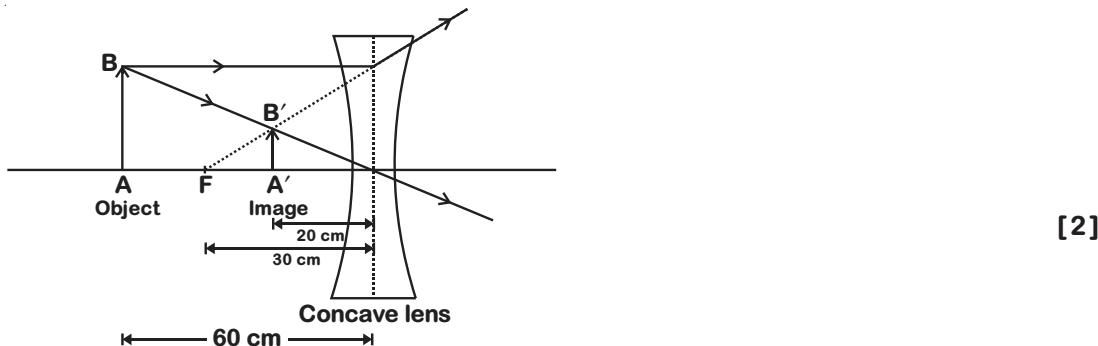
20. **(a)** With the help of a suitable circuit diagram prove that the reciprocal of the equivalent resistance of a group of resistances joined in parallel is equal to the sum of the reciprocals of the individual resistances. **[5]**

   (b) In an electric circuit two resistors of 12 Ω each are joined in parallel to a 6 V battery. Find the current drawn from the battery.

<div align="center">OR</div>

An electric lamp of resistance 20 Ω and a conductor of resistance 4 Ω are connected to a 6 V battery as shown in the circuit. Calculate :
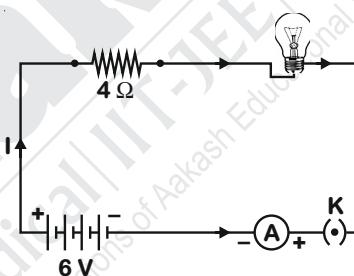
   (a) the total resistance of the circuit,

   (b) the current through the circuit,

   (c) the potential difference across the (i) electric lamp and (ii) conductor, and

   (d) power of the lamp.

Sol. **(a)** Consider three resistors R_1, R_2, R_3 connected in parallel with a battery as shown in the figure

[½]

The potential difference across each of the resistor is same as the applied voltage, but the value of current across each resistor is different.

Let I_1, I_2, I_3 be the current flowing through R_1, R_2 and R_3 respectively.

$\therefore$ $I = I_1 + I_2 + I_3$ ...(i)   [½]

Let the effective resistance of this parallel combination be R_P, then using, Ohm's law

$$I = \frac{V}{R_P}$$ ...(ii)   [½]

As V is same for all resistor, therefore

$$I_1 = \frac{V}{R_1} , \ I_2 = \frac{V}{R_2} , \ I_3 = \frac{V}{R_3}$$ ...(iii)   [½]

Hence, from equations (i), (ii) and (iii), we get

$$\frac{V}{R_P} = \frac{V}{R_1} + \frac{V}{R_2} + \frac{V}{R_3} = V\left(\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}\right)$$ [½]

$$\boxed{\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}}$$ [½]

i.e., the reciprocal of effective resistance in parallel combination is equal to the sum of reciprocals of all the individual resistances.

(b) $\therefore$ $\dfrac{1}{R_{eq}} = \dfrac{1}{R_1} + \dfrac{1}{R_2}$ [½]

$$\frac{1}{R_{eq}} = \frac{1}{12} + \frac{1}{12} = \frac{2}{12}$$ [½]

$R_{eq} = 6\ \Omega$

$\therefore$ $I = \dfrac{V}{R_{eq}}$ [½]

$I = \dfrac{6}{6} = 1\ A$ [½]

OR

(a) Here conductor and lamp are in series

$\therefore$ $R_{eq} = R_1 + R_2$ [½]

$R_{eq} = 4 + 20 = 24\ \Omega$ [½]

(b) $\therefore$ $I = \dfrac{V}{R_{eq}}$ [½]

$I = \dfrac{6}{24} = 0.25\ A$ [½]

(c) (i) Potential difference across the electric lamp

$\therefore$ $V_L = IR_L$

$V_L = 0.25 \times 20$

$V_L = 5\ V$ [1]

(ii) Potential difference across the conductor

$V_C = IR_C$

$V_C = 0.25 \times 4$

$V_C = 1\ V$ [1]

(d) Power of the lamp

$$\therefore \quad P = \frac{V_L^2}{R_L}$$ [½]

$$P = \frac{(5)^2}{20} = \frac{25}{20}$$

$$P = 1.25 \text{ W}$$ [½]

21. What is a solenoid? Draw the pattern of magnetic field lines of (i) a current carrying solenoid and (ii) a bar magnet. List two distinguishing features between the two fields. **[5]**

Sol. A solenoid is a long cylindrical coil containing a large number of closely spaced turns of insulated copper wire. **[1]**
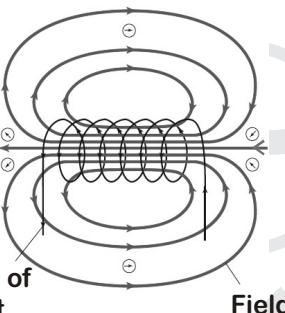
(i) [1]

Direction of current | Field lines
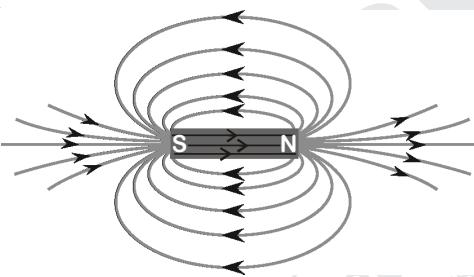
(ii) [1]

Distinguish between the two fields are

(i) The strength of magnetic field due to solenoid can be changed while the magnetic field strength due to bar magnet cannot be changed. **[1]**

(ii) Solenoid produces magnetic field so long as current flows in its coils while bar magnet produces a permanent magnetic field. **[1]**

Section-E

22. Blue litmus solution is added to two test tubes A and B containing dilute HCl and NaOH solution respectively. In which test tube a colour change will be observed? State the colour change and give its reason. **[2]**

OR

What is observed when 2 mL of dilute hydrochloric acid is added to 1 g of sodium carbonate taken in a clean and dry test tube? Write chemical equation for the reaction involved.

Sol. The colour change will be observed in test tube A only. [1]

The colour of blue litmus solution becomes red as acid turns blue litmus red. [1]

OR

When 2 mL of dilute HCl is added to 1 g of sodium carbonate, CO_2 is evolved with brisk effervescence along with the formation of water and sodium chloride salt. [1]

$$Na_2CO_3(s) + 2HCl(aq) \longrightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$$
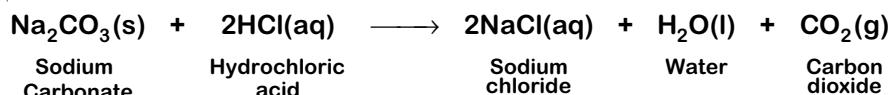
Sodium Carbonate   Hydrochloric acid   Sodium chloride   Water   Carbon dioxide [1]

23. In three test tubes A, B and C, three different liquids namely, distilled water, underground water and distilled water in which a pinch of calcium sulphate is dissolved, respectively are taken. Equal amount of soap solution is added to each test tube and the contents are shaken. In which test tube will the length of the foam (lather) be longest? Justify your answer. [2]

Sol. The length of the foam (lather) will be longest in test tube A. [1]

**Reason :** Soap produces good lather with soft water (distilled water) only.

Both test tubes B and C contain hard water and soap forms scum in hard water. [1]

24. A student is observing the temporary mount of a leaf peel under a microscope. Draw labelled diagram of the structure of stomata as seen under the microscope. [2]

OR

Draw a labelled diagram in proper sequence to show budding in hydra.

Sol.

- Stomatal aperture (opened)
- Epidermal cells
- Guard cells
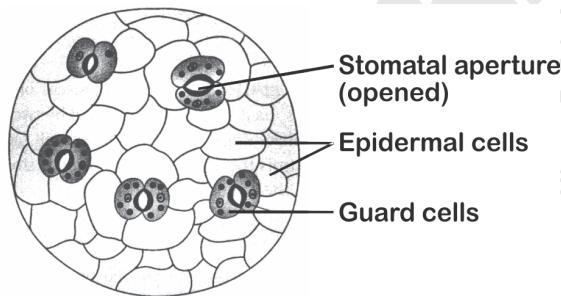
$$\left[\begin{array}{l} \text{Diagram} - \frac{1}{2} \\ \text{Labelling} - 3 \times \frac{1}{2} \end{array} \right]$$

Leaf peel with open stomata

OR

- Tentacles
- Bud
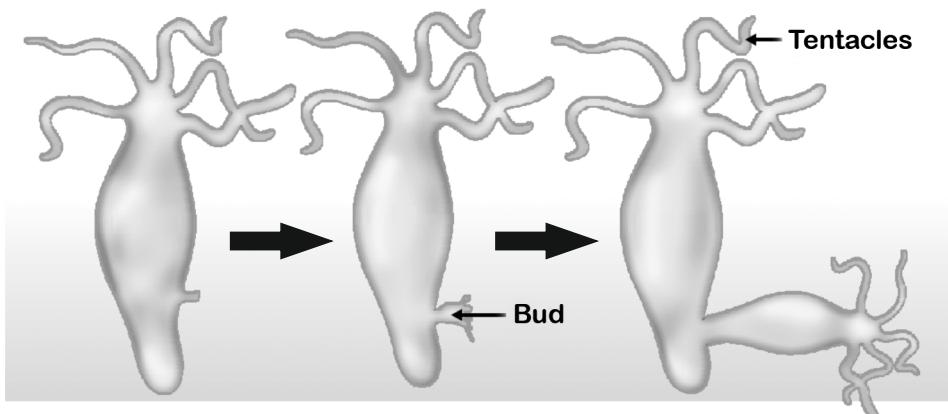
$$\left[\begin{array}{l} \text{Diagram} - 1 \\ \text{Labelling} - 2 \times \frac{1}{2} \end{array} \right]$$

Budding in Hydra

25. In the experimental set up to show that "CO_2 is given out during respiration", name the substance taken in the small test tube kept in the conical flask. State its function and the consequence of its use. **[2]**

Sol. The substance taken in the small test tube kept in the conical flask is KOH (potassium hydroxide) solution. **[1]**

The CO_2 produced by germinating seeds is absorbed by KOH solution due to which the air from the bent tube moves into the conical flask, which eventually pulls the water up in the bent glass tube. **[1]**

26. While studying the dependence of potential difference (V) across a resistor on the current (I) passing through it, in order to determine the resistance of the resistor, a student took 5 readings for different values of current and plotted a graph between V and I. He got a straight line graph passing through the origin. What does the straight line signify? Write the method of determining resistance of the resistor using this graph. **[2]**

OR

What would you suggest to a student if while performing an experiment he finds that the pointer/needle of the ammeter and voltmeter do not coincide with the zero marks on the scales when circuit is open? No extra ammeter/voltmeter is available in the laboratory.

Sol. Straight line signify that the potential difference applied across the resistor is directly proportional to the current flowing through it. **[1]**

To determine the resistance from the graph, read the current value, in amperes corresponding to a given voltmeter reading and take the ratio $\left(\dfrac{V}{I}\right)$. Thus the resistance of conductor is determined in ohms. **[1]**

OR

If the pointer is above the zero mark, the zero error is negative. The number of division it is above the zero mark are to be subtracted from reading. **[1]**

If the pointer is below zero mark, the zero error is positive. The number of division it is below the zero mark are to be added to reading. **[1]**

27. List four precautions which a student should observe while determining the focal length of a given convex lens by obtaining image of a distant object on a screen. **[2]**

Sol. (i) The lens should be held in vertical position with its face parallel to screen. **[½]**

(ii) A clear and sharpest image of the distant object should be obtained by suitably adjusting the position of lens. **[½]**

(iii) At least three observation should be taken. **[½]**

(iv) Measure the distance between the convex lens and the screen carefully. **[½]**

❑ ❑ ❑