CBSE Sample Paper – 01
SUMMATIVE ASSESSMENT –I
SCIENCE (Theory)
Class – X

Time allowed: 3 hours   Maximum Marks: 90

General Instructions:

a) All questions are compulsory.
b) The question paper comprises of two sections, A and B. You are to attempt both the sections.
c) Questions 1 to 3 in section A are one mark questions. These are to be answered in one word or in one sentence.
d) Questions 4 to 6 in section A are two marks questions. These are to be answered in about 30 words each.
e) Questions 7 to 18 in section A are three marks questions. These are to be answered in about 50 words each.
f)   Questions 19 to 24 in section A are five marks questions. These are to be answered in about 70 words each.
g) Questions 25 to 27 in section B are 2 marks questions and Questions 28 to 36 are multiple choice questions based on practical skills. Each question of multiple choice questions is a one mark question. You are to select one most appropriate response out of the four provided to you.

Section A

1. Why are food particle preferably packed in aluminum foil?
2. Give one example each of saprophytic and parasitic nutrition.
3. There are two electric bulbs (i) marked 60 W, 220 V and (ii) marked 100 W, 220 V. Which one of the two has a higher resistance? On which the resistivity of a metallic wise depends.
4. (i) If H^+ concentration of a solution is 1×10^{-2} mol L^{-1} what will be its P4 value?
    (ii) Which has a higher pH value, 1 M HCl or 1 M NaOH solution?
5. Taking the example of auxins and cytokinins together, explain (i) a synergistic action in plants, (ii) an antagonistic action in plants.
6. Draw a schematic diagram of a circuit consisting of 3V battery, 5 ohm, 3 Ω and 1 Ω resistor, an ammeter and a plug key, all connected in series.
7. What happens chemically when quick lime is added to water?
8. What happens when Zn metal is dipped in $CuSO_4$ solution? Give the chemical reaction involved. State which is more reactive, Zn or Cu?
9. (a) Name the raw material used in the manufacture of sodium carbonate by Solvay process.
    (b) How is the sodium hydrogen carbonate formed during Solvay process separated from a mixture of NH_4Cl and $NaHCO_3$?
    (c) How is sodium carbonate obtained from sodium hydrogen carbonate?
10. (a) Explain the term 'roasting' as used in metallurgical processes. Give one suitable example for it.
    (b) What changes takes place when Cinnabar (HgS) is heated in air for a long enough time?

11. Describe with labelled diagram, the Froth Floatation Process used to separate the gangue from a Sulphide ore.
12. Discuss the mode of nutrition in amoeba.
13. Write the functions of the following in the digestive process:
    (a) Bile
    (b) Bicarbonate secreted by the duodenal wall.
    (c) Pancreatic amylase.
14. What are 'hormones'? Write any two functions of hormones.
15. Mrs. Sharma has gone to the jewelers to buy gold jewellery. She asks the jeweler if the jewellery is made of pure gold. The jeweler assure her that it is 10% gold and nothing has been mixed in it. Mrs. Sharma is happy and buys the necklace.
    Read the above passage and answer the following questions:
    (a) Was the jeweler right in saying that the necklace is made of 100% gold?
    (b) What values are promoted by the jeweler?
    (c) What precautions should you take while purchasing gold jewellery?
    (d) Why does Government insist on purchasing Hallmarked jewellery?

    [Value Based Questions]
16. What is a solenoid? Draw magnetic field lines showing the magnetic field inside and outside the current carrying solenoid?
17. What is biogas? How can biogas be obtained? Why the use of biogas obtained from cow dung is advised to use as compared to cow dung cakes?
18. Name three forms in which energy from ocean is made available for use. What are OTEC power plants? How do they operate?
19. Write the balanced chemical equation for the following and identify the type of reaction in each case.
    (i)   Potassium bromide(aq) + Barium iodide(aq) $\rightarrow$ Potassium iodide(aq) + Barium bromide(s)
    (ii) Zinc carbonate(s) $\rightarrow$ Zinc oxide(s) + Carbon dioxide(g)
    (iii) Hydrogen(g) + Chlorine(g) $\rightarrow$ Hydrogen chloride(g)
    (iv) Magnesium (s) + Hydrochloric acid(aq) $\rightarrow$ Magnesium chloride(aq) + Hydrogen(g)
    (v)   Iron(III) oxide(s) + Carbon monoxide(g) $\rightarrow$ Iron(s) + Carbon dioxide

    Or

    Give the characteristic tests for the following gases:
    (i) CO_2 (ii) SO_2 (iii) O_2 (iv) H_2
20. Differentiate between an alloy and an amalgam. How are alloys made? State with examples any two properties in which an alloy may be different from those of its constituents. Write the constituents and special advantages of:
    (i) Stainless Steel   (ii) Magnalium

    Or

    What is meant by the term "Enrichment of Ore"? Name four methods generally used for enrichment of ore. With the help of a labelled diagram, describe the method for the enrichment of sulphide ore.

21. Describe the structure and functioning of nephrons.

Or

(a) Explain why the rate of photosynthesis in plant is low both of lower and higher temperature.

(b) Is green light most or least useful in photosynthesis and why?

(c) Describe an activity to show that chlorophyll is necessary for photosynthesis in plants.

22. Draw the schematic diagram of a circuit containing the following electrical equipments:

(i) a resistance (ii) a voltmeter (iii) an electric bulb

(iv) a cell (v) plug key (open) (vi) an ammeter

Or

Three incandescent bulbs of 100 W each are connected in series in an electric circuit. In other set of three bulbs of the same wattage are connected in parallel to the source.

(a) Will the bulb in the two circuits glow with the same brightness? Justify your answer.

(b) Now, let one bulb in both the circuits get fused. Will the rest of the bulbs continue to glow in each circuit? Give reason.

23. Explain the principle, construction and working of an electric motor with a help of labeled diagram?

Or

Current- time graph from two different sources are shown in the figure.
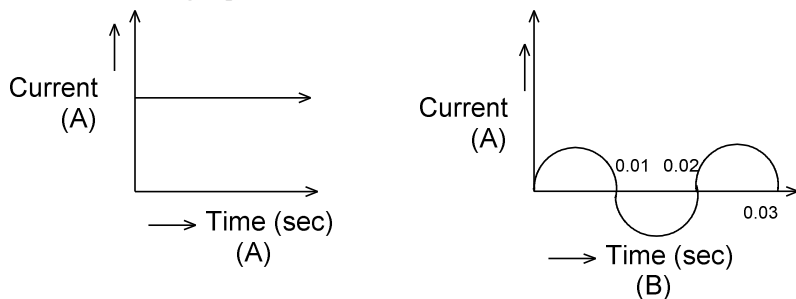
(i) Name the type of current shown by graph (A) and (B)?

(ii) Name any one source of shown by (A) and (B)?

(iii) What is frequency of current in case (B)?

(iv) Write two difference between current shown by (A) and (B)?

24. Draw the line of forces (indicating field direction) of the magnetic field through and around (a) a single loop wire carrying electric current and (b) a solenoid carrying electric current.
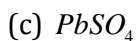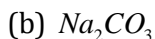
Or

(a) Draw a schematic diagram of a domestic electric circuit which includes a main fuse, a power meter, a light point, a fan and a power plug.

(b) Why is it necessary to earth the metallic electric appliances?

Section B

25. An acid can react with

(a) $AgCl$

(b) Na_2CO_3

(c) $PbSO_4$

(d) Na_2SO_4

Write chemical reactions involved.

26. A student wanted to decolourise a leaf. In which solvent, he should boil the leaf? Justify your answer.

27. The current flowing through a resistor connected in an electrical circuit and the potential difference developed across its ends is shown in figure. Calculate the value of resistance of the resistor in ohms.
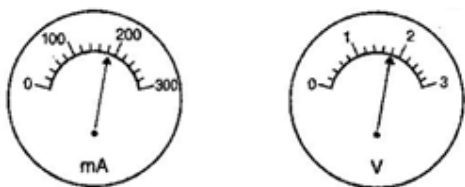

28. Given below are the observations reported by four students I, II, III and IV for the changes observed with dilute HCl or dilute NaOH and different materials.

Material	DilHCl	Dil. NaOH
I. Moist litmus paper	Blue to red	Red to blue
II. Zinc metal	React at room temperature	Does not react at room temperature
III. Zinc metal on heating	Liquid becomes milky	Remains clear and transparent
IV. Solid sodium bicarbonate	No reaction	Brisk effervescence

The incorrectly reported observation is:

(a) I   (b) II   (c) III   (d) IV

29. A drop of liquid sample was put on the pH paper, paper turned blue. The liquid sample must be of

(a) Lemon Juice

(b) HCl

(c) Sodium bicarbonate

(d) Ethanoic acid

30. A student asked to demonstrate the following two properties of sulphur dioxide gas:

I.   It is heavier than air and

II.   It is highly soluble in water.

Which two of the following four arrangements would the student use to demonstrate these properties:
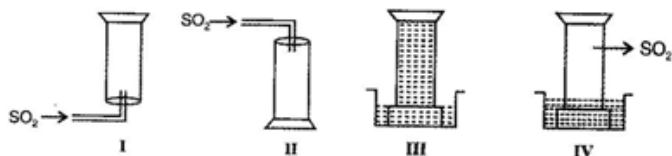

(a) I and II   (b) II and III   (c) I and III   (d) II and IV

31. Medulla Oblongata is originated from:

    (a) Mesoderm   (b) Ectoderm   (c) Endoderm   (d) Ectomesoderm

32. The innermost layer of the human eye is:

    (a) sciera   (b) cornea   (c) retina   (d) lens

33. In the experiment on studying the dependence of current (I) on potential difference (V), four student set up their circuits as shown below:
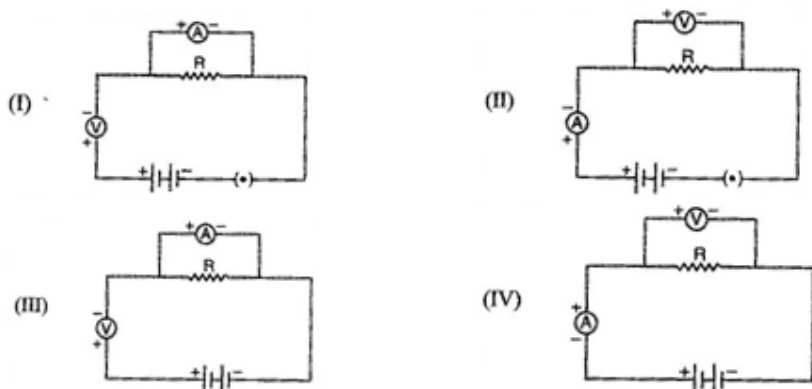
    The best set up is that of:

    (a) student I   (b) student II   (c) student III   (d) student IV

34. The following circuit diagram shows the experimental set-up for the study of dependence of current on potential difference. Which two circuit components are connected in series:
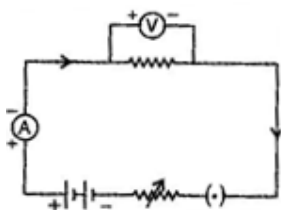
    (a) Battery and Voltmeter   (b) Ammeter and Voltmeter

    (c) Ammeter and Rheostat   (d) Resistor and Voltmeter

35. For a current in a long straight solenoid N and S-poles are created at the two ends. Among the following statements, the incorrect statement is:

    (a) The field lines inside the solenoid are in the form of straight lines which indicate that the magnetic field is the same at all the points inside the solenoid.

    (b) The strong magnetic field produced inside the solenoid can be used to magnetize a piece of magnetic material like soft iron, when placed inside the coil.

    (c) The pattern of magnetic field associated with the solenoid is different from the pattern of the magnetic field around a bar magnet.

    (d) The N and S-poles exchange position when the direction of current through the solenoid is reversed.

36. Which is the ultimate source of energy:

    (a) Water   (b) Sun   (c) Uranium   (d) Fossil fuels

(Solutions)

SECTION-A

1. Aluminium foil do not corrode in atmosphere even if kept for a long time because a protective coating of aluminium oxide (Al_2O_3) is formed on the surface of the foil and stops any further reaction of the metal with air and water thus food particles do not get spoiled.

2. Parasitic Nutrition – Plasmodium (Protozoa)
    Saprophytic Nutrition – fungi

3. $P = \dfrac{V^2}{R} \implies P \propto \dfrac{1}{R} \implies R \propto \dfrac{1}{P}$

4. (i) $\left[H^+ \right] = 1 \times 10^{-2} \, mol \, L^{-1} = 10^{-2} M$

    $PH = log \left[\dfrac{1}{H^+} \right] = -log \left[H^+ \right]$

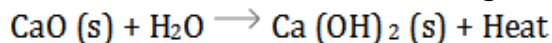 $= -log \left[10^{-2} \right] = -(-2) log 10 = 2$

    (ii) 1 M NaOH has a higher pH value.

5. (i) A synergistic action in plants: In tissue cultures of parenchyma, mitosis are accelerated when both auxin and cytokinin are present.

    (ii) an antagonistic action in plants: Auxin stimulates the growth of apical bud and suppresses the growth of lateral buds (apical dominance), whereas cytokinin promotes the growth of lateral buds and suppresses apical dominance.
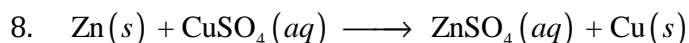
6.
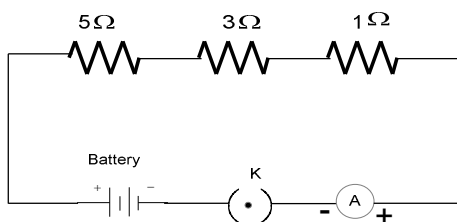
7. When quick lime is added to water calcium hydroxide (slaked lime) is formed with a hissing sound and lot of heat is evolved during the reaction. The reaction involved is

    CaO (s) + H₂0 $\longrightarrow$ Ca (OH)₂ (s) + Heat
    Quick lime   Slaked lime

8. $Zn(s) + CuSO_4(aq) \longrightarrow ZnSO_4(aq) + Cu(s)$
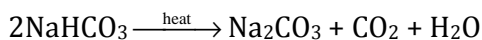
    Zinc   Blue   colourless   copper

    Blue colour of copper sulphate gets discharged and reddish brown copper metal gets deposited.

Zn is more reactive than Cu.

9. (a) Sodium chloride (NaCl), Ammonia (NH_3), Limestone ($CaCO_3$)

(b) It is done by filtration.

(c) Sodium hydrogen carbonate is heated to get sodium carbonate.

$$2NaHCO_3 \xrightarrow{\text{heat}} Na_2CO_3 + CO_2 + H_2O$$

10. (a) Roasting is a process in which sulphide ore is heated strongly in the presence of oxygen so as to convert sulphide ore into oxide ore and sulphur is oxidized to SO_2.

$$2ZnS + O_2 \longrightarrow Hg + SO_2$$
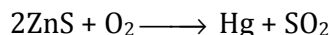
(b) Cinnabar gets reduced to form Mercury.

$$HgS + \quad O_2 \longrightarrow Hg \quad + S_2$$
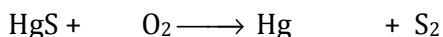
Cinnabar   Oxygen   Mercury   Sulphur dioxide

11. Sulphide ore is mixed with water and pine oil. The mixture is agitated (shaken vigorously) with the help of stirrer in the blast of air. Froth is formed, sulphide ore gets attracted towards pine oil in the froth which is skimmed off, dried and concentrated sulphide ore is obtained. Gangue is left behind at the bottom of water.

Froth floatation process.
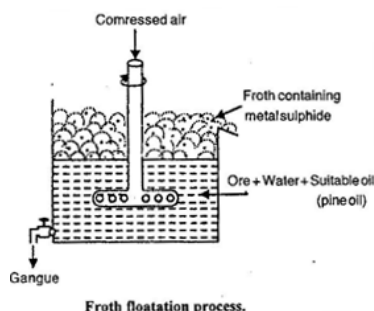
12. Steps of Nutrition in amoeba –

(a) Formation of pseudopodia – When Amoeba comes in contact with a food particle, it forms pseudopodia which envelops food particles.

(b) Ingestion – The tips of pseudopodia fuse with each other, together with variable amount of food particles and water, forms food vacuole, this process is known as ingestion.

(c) Digestion – The vacuoles are surrounded by lysosomes which fuses with vacuole and digest the food particles present in vacuole.

(d) Exocytosis – The soluble products of digestion are passed out into due cytoplasm from the food vacuole. And the remaining undigested materials are passed out of the body with the help of a process called exocytosis.

13. The functions of the following in the digestive process are:

(a) **Bile**: Bile in the duodenum emulsifies fat present in the food, i.e. breaks fat molecules into small globules.

(b) **Bicarbonate secreted by the duodenal wall**: Bicarbonate ions secreted by the duodenal wall mke the medium alkaline because such a medium is required for the action of pancreatic enzymes.

(c) **Pancreatic amylase**: Pancreatic amylase acts on starch and hydrolyses it into maltose and isomaltose.

14. 'Hormones' are chemical substances secreted in trace amounts by specialized tissues called endocrine glands.

The two functions of hormones are as follows:

(i) Hormones coordinate the activities of the body and also its growth.

(ii) Hormones regulate many functions like metabolism and reproduction in our body.

15. (a) No, he was wrong. Pure gold is very soft and is therefore not suitable for making jewellery. It is alloyed with either silver or copper to make it hard. But sometimes jewelers mix a large quantity of copper and silver in gold to earn more profit.

(b) Untrustworthiness, cleverness.

(c) We should always purchase the gold jewellery from a branded shop with proper receipt and Hallmark certificate.

(d) Government insists on purchasing Hallmarked jewellery as it contains the gold and its alloyed metal (i.e. copper or silver) in a fixed ratio.

16. A solenoid is a coil of many turns of insulated copper wire closely wound in the shape of a ring.
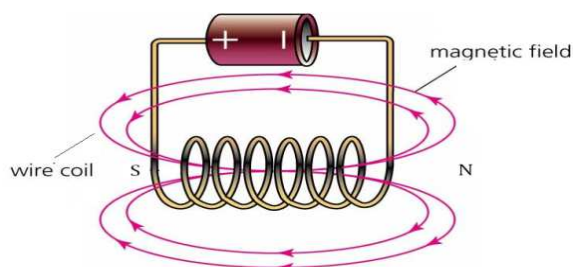
17. Biogas is a mixture of gases namely methane, Co_2, H_2 and H_2S. it is obtained from an aerobic decomposition of cow dung and plants and animal wastes in a biogas plants. Biogas is advised for burning in preference to burning of cow- dung cakes because:

(i) it cause no air pollution

(ii) It is a cheaper source of energy.

18. Three forms of oceanic energy are:

(a) Sea wave energy

(b) Tidal energy

(c) Ocean thermal energy

OTEC power plant: The plants which are used to harness ocean thermal energy is called OTEC power plant.

Working of OTEC power plant: A temperature difference between warm surface water heated by sun and colder water at deeper level up to 1000 m is 20° C ore more is required to operate OTEC plant.

In the OTEC system, the warm surface water is used to boil a liquid like ammonia. The vapour of liquid is then used to rotate the turbine of a generator. The cold water from the deeper level is used to convert the ammonia vapour again into liquid.

19. (i) $2KBr(aq)+BaI_2(aq)\rightarrow 2KI(aq)+BaBr_2(s)$; Double displacement reaction

(ii) $ZnCO_3(s)\rightarrow ZnO(s)+CO_2(g)$; Decomposition reaction

(iii) $H_2(g)+Cl_2(g)\rightarrow 2HCl(g)$; Combination reaction
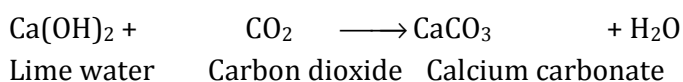
(iv) $Mg(g)+2HCl(aq)\rightarrow MgCl_2(aq)+H_2(g)$; Displacement reaction

(v) $Fe_2O_3(s)+3CO(g)\rightarrow 2Fe(s)+3CO_2(g)$ Redox reaction

Or

(i) Carbon dioxide (CO_2) gas turns lime water milky when passed through it due to the formation of insoluble calcium carbonate.

$Ca(OH)_2$ + CO_2 $\longrightarrow CaCO_3$ + H_2O

Lime water   Carbon dioxide   Calcium carbonate

(ii) Sulphur dioxide (SO_2) gas when passed through acidic potassium permanganate solution (purple in colour) turns it colourless because SO_2 is a strong reducing agent.

$2KMnO_4$ + $2H_2O + 5SO_2 \longrightarrow K_2SO_4$ + $2MnSO_4 + 2H_2SO_4$

Potassium   Sulphur   Potassium   Manganese

Permanganate   dioxide   sulphate   sulphate

(purple)   (colourless)   (colourless)
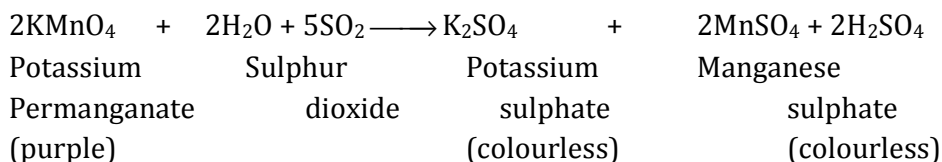
(iii) The evolution of oxygen (O_2) gas during a reaction can be confirmed by bringing a burning candle near the mouth of the test tube containing the reaction mixture. The intensity of the flame increases because oxygen supports burning.

(iv) Hydrogen (H_2) gas burns with a pop sound when a burning candle is brought near it.

20. "Alloy" is homogeneous mixture of two or more metals. One of them can be non-metal also.

"Amalgam" is a homogeneous mixture of metal and mercury.

Alloys are made by melting the two metals together.

Manganese steel is an alloy of Fe, C and Mn. It does not get rusted whereas iron gets rusted. It is very hard and tough as compared to iron. Nickel steel contains Fe, C and 36% Ni. It does not get rusted and it has least coefficient of thermal expansion as compared to iron.

(i) **Stainless Steel**: It contains 18% Cr and Ni and remaining is Fe. It is resistant to corrosion.

(ii) **Magnalium**: It is an alloy of magnesium and aluminium. It is light and does not get corroded.

Or

The process of separating impurities from the ore is called Enrichment of Ores.

Four methods of enrichment of ores are:

(i) Froth floatation process   (ii) Chemical separation

(iii) Hydraulic washing   (iv) Magnetic separation

Froth floatation process: It is used to separate gangue from the sulphide ores especially of copper. In this process, the finally powdered ore is mixed with water in a large tank to form a slurry. Then some pine oil is added to it. The sulphide ores are preferentially wetted by the pine oil whereas the gangue particles are wetted by water. When air is blown through the mixture, the lighter oil froth carrying the metal sulphides rises to the top of the tank and floats as scum. It is then skimmed off and dried. The gangue particles being heavier, sink to the bottom of the tank.

Froth floatation process
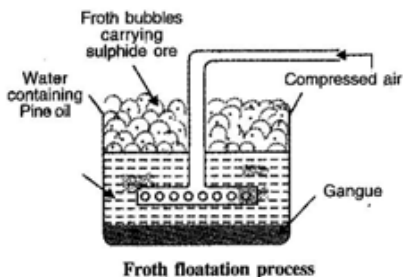
21. **Structure of Nephron:** Nephron is the structural and functional unit of kidney.
   (i) It consists of a long coiled tubule differentiated into proximal tubule, loop of Henle and distal tubule. The latter opens into the collecting tubule.
   (ii) At the proximal end of the nephron lies a double-walled cup-shaped structure called Bowman's capsule.
   (iii) The Bowman's capsule contains a bundle of blood capillaries which is called glomerulus.
   (iv) In the glomerulus, the blood that comes in through afferent arteriole is drained out through efferent arteriole.

   Functions of Nephron:
   (i) Filtration: Filtration of blood takes place in Bowman's capsule from the capillaries of glomerulus. This takes place under high pressure. The filtrate passes into the tubular part of the nephron. This filtrate contains glucose, amino acids, urea, uric acid, salts and major amount of water.
   (ii) Reabsorption: As the filtrate flows along the tubule, useful substances such as glucose, amino acids, salts and water are selectively reabsorbed into the blood by capillaries surrounding the nephron tubule. The amount of water reabsorbed depends on the need of the body and also on the amount of wastes to be excreted.
   (iii) Tubular secretion: Certain substances which are harmful and not needed by the body like ammonia, potassium, creatinine and hydrogen ions are secreted from the capillary blood into the lumen of distal tubule. This is called tubular secretion.

Or

(a) The process of photosynthesis involves the activities of a number of enzymes. These enzymes work more efficiently within a certain range of temperature which is neither very low nor very high. At low temperature the activity of enzymes is lowered due to which the rate of photosynthesis is also low. Again when the temperature is very high, the activity of enzymes decreases, which leads to low rate of photosynthesis.

(b) Green light is least useful in photosynthesis because the chlorophyll pigment reflects it back.

(c) Activity to show that chlorophyll is necessary for photosynthesis is plants:
   (i) A potted plant is kept in dark continuously for 72 hours.
   (ii) A leaf of this plant and also a leaf of a plant kept in the Sun for a long time is taken.
   (iii) The leaves are dipped in boiling water for a few minutes to denature the enzyme.
   (iv) Then the leaves are boiled in alcohol.
   (v) The process will remove the chlorophyll and leaves will turn colourless.
   (vi) Again the leaves are put in hot water to make them soft.
   (vii) A few drops of iodine solution is poured on both the leaves and the colour is observed.
   (viii) The colour of the leaf kept in sunlight will turn blue, which shows the presence of starch. The leaf that was kept in dark becomes brown.
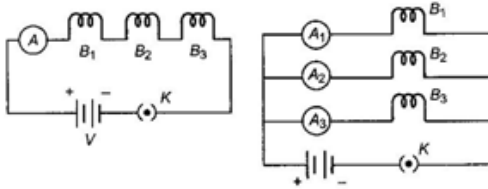
   From his observation, it is shown that chlorophyll is necessary for photosynthesis in plants.

22.
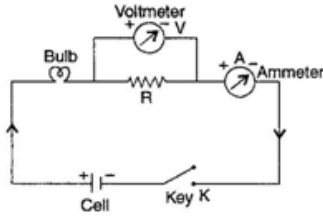
Or

Let us assume that the resistance of each bulb be R. The circuit diagram in two cases may be drawn as given below.

Equivalent resistance in series combination R_s = R + R + R = 3R, Voltage = V

Let current through each bulb in series combination be I_1. By Ohm's law,

$$V = I_1 \times 3R \qquad \Rightarrow \qquad I_1 = \frac{V}{3R}$$

∴   Power consumption of each bulb in series combination.

$$P_1 = I_1^2(3R) = \left(\frac{V}{3R}\right)^2 \times 3R = \frac{V^2}{9R^2} \times 3R = \frac{V^2}{3R} \qquad\qquad \text{.........(i)}$$

For parallel circuit,

The resistance of each bulb = R, Voltage across each bulb = V

     (∵ same voltage in parallel combination)

∴   Power consumption of each bulb in parallel combination $P_2 = \dfrac{V^2}{3R}$ ....(ii)

From eq. (i) and (ii), $\dfrac{P_2}{P_1} = \dfrac{(V^2/R)}{(V^2/3R)} = 3$ $\Rightarrow$ $P_2 = 3P_1$

Therefore, each bulb in parallel combination glow 3 times brighter to that of each bulb in series combination.

(b) When one bulb gets fused in both the circuit, then in series combination, circuit gets broken and current stops flowing whereas in parallel combination, same voltage continue to act on the remaining voltage and hence other bulbs continue to glow with same brightness.

23. Principle – it is based on the principal that a current carrying conductor placed perpendicular to the magnetic field experiences a force.

Construction-

(1) Armature or coil- It consist of an insulated copper wire wound on a soft iron core.

(2) Strong field magnet- two pole pieces of a strong magnet provides a strong magnetic field.

(3) Split ring- it consist of two halves (R_1 and R_2) of a metallic ring which reverses the direction of the current in a coil.

(4) Brushes- two carbon brushes touch the commutator (split ring).

(5) Battery – a battery is connected across the carbon brushes.
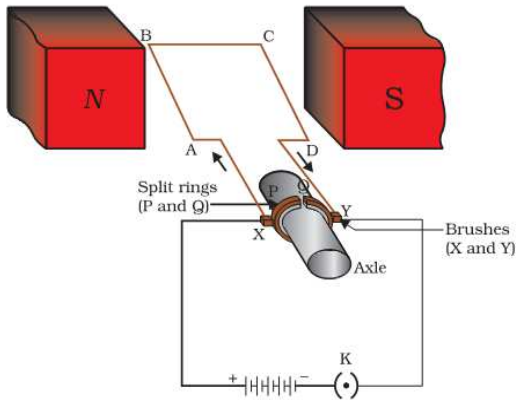
<div align="center">**Or**</div>

(1) Graph A represent D.C. and graph B represent A.C.

(2) Source of (A) – Dry cell

Source of (B) - A.C. generator

(3) For graph (B)

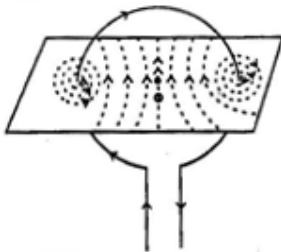$$f = \frac{I}{T} = \frac{1}{0.02}$$

f = 50 Hz

(4)

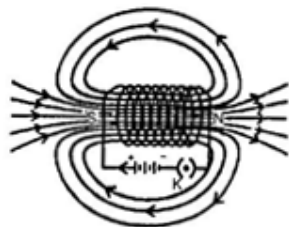| Direct Current	Alternating Current
Its magnitude is constant and flows in one direction only.	Its magnitude and direction reserves periodically.
The frequency of D. C. Zero.	The frequency of A. C. is finite.

24.

(a)

(b)

<div align="center">**Or**</div>

(a)

(b) Use of earthing in metallic electric appliances will neutralize any potential in case of short-circuiting and the person, operating will not get a shock. The appliances will stop functioning in case of any malfunctioning.

Section B

25. (b)
26. He should boil the leaf in Alcohol. Alcohol dissolved the chlorophyll and decolourise the leaf.
27. $R = \dfrac{V}{I} = \dfrac{1.8\ V}{180\ mA} = \dfrac{1.8 \times 10^3}{180} = \dfrac{1800}{180} = 10\ \Omega$
28. (d)
29. (c)
30. (d)
31. (b)
32. (c)
33. (b)
34. (c)
35. (c)
36. (b)