CBSE Sample Paper-01 (solved)
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. What happens when a chemical reaction occurs?
2. Name the two stages of photosynthesis.
3. What is meant by the statement, "Potential difference between points A and B in an electric field is 1 volt"?

4. (a) What is observed when sulphur dioxide is passed through (i) water, (ii) limewater?
   (b) Also write chemical equations for the reactions that takes place.

5. Name the hormone responsible for regulation of:
   (i) Metabolism of carbohydrates, fats and proteins.
   (ii) Balance of calcium and phosphate.
   (iii) Blood pressure.
   (iv) Water and electrolytic balance.

6. With the help of neat diagram describe how you can generate induced current in the circuit.

7. Identify the substances oxidized and the substances reduced in the following reactions. Write the ionic equation for the substances oxidized and reduced.
   (a) $H_2(g) + Cl_2(g) \longrightarrow 2HCl(g)$
   (b) $H_2(g) + CuO(s) \longrightarrow Cu(s) + H_2O(l)$
   (c) $H_2S(g) + SO_2(g) \longrightarrow S(s) + H_2O(l)$

8. $2FeSO_4(s) \longrightarrow Fe_2O_3(s) + SO_2(g) + SO_3(g)$. Is it a redox reaction or not? If yes, why?

9. (a) Write the formula and chemical name of Bleaching powder.
   (b) Write chemical equation to represent the action of atmospheric CO_2 gas on bleaching powder when left exposed in open.
   (c) State for what purpose is bleaching powder used in water treatment plants.
10. 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]
11. Describe with labelled diagram, the Froth Floatation Process used to separate the gangue from a Sulphide ore.
12. (a) Draw diagram of a Stomata when it is open.
    (b) Label Epidermal cell, Guard cell, Chloroplast and Stomatal opening on the diagram drawn.

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. (a) State Ohm's law.
    (b) Draw a schematic diagram of the circuit for studying Ohm's law.

16. The flow of a current in a circular loop of wire creates a magnetic field at its centre. How many existence of this field be detected? State the rule which helps to predict the direction of this magnetic field.

17. (a) Describe the steps involved in obtaining biogas and explain what is meant by anaerobic decomposition.
    (b) Which isotope of Uranium can undergo fission readily?

18. (a) State one limitation of solar energy available from solar cells.
    (b) What is the minimum wind velocity required to obtain useful energy with a wind mill.
    (c) Define the term 'Nuclear fission'.

19. Identify the type of chemical reaction taking place in each of the following:
    (i) Barium chloride solution is mixed with copper sulphate solution and a white precipitate is observed.
    (ii) On heating copper powder in air in a China dish, the surface of copper powder turns black.
    (iii) On heating green coloured ferrous sulphate crystals reddish brown solid is left and small of a gas having odour of burning sulphur is experienced.
    (iv) Iron nails when left dipped in blue copper sulphate solution become brownish in colour and the blue colour of copper sulphate fades away.
    (v) Quick lime reacts vigorously with water releasing a large amount of heat.

Or

During the reaction of some metals with dilute hydrochloric acid, following observations were made:
(i) Silver metal doesn't show any change.
(ii) The temperature of reaction mixture rises when aluminium (Al) is added.
(iii) The reaction of sodium metal is found to be highly explosive.
(iv) Some bubbles of a gas are seen when lead (Pb) is reacted with the acid.
(v) A gas produced when sodium carbonate is added to the acid.
Explain these observations giving suitable reasons.

20. Give reasons for the following:
    (a) Metals conduct electricity.
    (b) Metals generally do not form compounds with hydrogen.
    (c) A piece of zinc placed in blue copper sulphate solution decolourize it.
    (d) Alumina is dissolve in molten cryolite for electrolysis to obtain aluminium metal.
    (e) Nitrogen gas is used to preserve food.

Or

(a) What is corrosion of metals? Name one metal which does not corrode and one which corrodes on being kept in atmosphere.
(b) How will you show that the rusting of iron needs oxygen and moisture at the same time.

21. (a) Draw a diagram of human alimentary canal.

(b) Label oesophagus, Liver, Pancreas and Gall bladder on the diagram drawn.
(c) What is the function of enzyme 'pepsin' in the digestion process?

Or

(a) Draw a diagram of the human urinary system and label on it:
(i) Kidney (ii) Ureter (iii) Urinary bladder (iv) Urethra
(b) Name the two major components of normal human urine.

22. (a) What is the function of an earth wire in electrical instruments? Why is it necessary to earth the metallic electric appliances?
(b) Explain what is short circuiting and overloading in an electric supply.
(c) What is the usual capacity of the fuse wire in the line to feed:
(i) Lights and fans?
(ii) Appliances of 2 kW or more power?

Or

(a) State Ohm's law.
(b) Describe the activity with the help of a diagram to establish the relationship between current (I) flowing in a conductor and potential difference (V) maintained across its two ends.
(c) Draw the shape of the curve obtained when a graph is plotted between I and V.

23. (a) What is meant by a magnetic field?
(b) How is the direction of magnetic field at a point determined?
(c) Describe an activity to demonstrate the direction of the magnetic field generated around a current carrying conductor.
(d) What is the direction of magnetic field at the centre of current carrying circular loop?

Or

(a) What is an electromagnet?
(b) List any of its two uses.
(c) Draw a labelled diagram to show how is an electromagnet made?
(d) What is the purpose of the soft iron core used in making an electromagnet?

24. (a) Distinguish between renewable and non-renewable sources of energy giving one example of each.
(b) Why is the use of wood as a fuel not advised although forests can be replenished?

Or

Explain why:

(a) It is difficult to burn a piece of wood fresh from a tree.

(b) Pouring dry sand over the fire extinguishes it.

(c) It is difficult to use hydrogen as a source of energy.

(d) Charcoal is considered a better fuel than wood.

Section B

25. In test tube A

    (i) the solution turns blue litmus red

    (ii) evolves H_2 gas with Zn metal

    (iii) gives out CO_2 on treatment with Na_2CO_3.

    In test tube B

    (i) the solution turns red litmus blue,

    (ii) liberate H_2 with Zn metal and

    (iii) does not react with Na_2CO_3.

    What are A and B? Give the chemical reactions involved.

26. (a) In plant, when stomata is opened in night, are called _____.

    (b) Justify your answer.

27. Why key used in electric circuit should be kept off? Give reason.

28. The pH of soft drink is _____ and they are _____.

    (a) less than 7, acidic (b) more than 7, basic

    (c) equal to 7, neutral (d) less than 7, basic

29. Conc. H_2SO_4 reacts with copper to form a sulphur dioxide gas. In this reaction, conc. H_2SO_4 act as a:

    (a) Oxidizing agent (b) Reducing agent

    (c) Dehydrating agent (d) Bleaching agent

30. What will happen when excess of SO_2 is passed through limewater and why:

    (a) The solution will become colourless due to formation of $Ca(HSO_3)_2$.

    (b) Limewater turns milky due to formation of $CaSO_3$.

    (c) The solution becomes green due to $CaSO_3$.

    (d) The solution becomes pink due to $Ca(HSO_3)_2$.

31. Sunlight used for photosynthesis is:

    (a) 5% (b) 50% (c) 0.5% (d) 4%

32. The process in which water is split during photosynthesis is called:
(a) Photolysis (b) Hydrolysis (c) Glycolysis (d) None of these

33. Ammeter is always connected in:
(a) Series (b) Parallel
(c) Either in series or parallel (d) Neither in series nor in parallel

34. For current flow one need a:
(a) Closed circuit (b) Source of potential difference
(c) Both (a) and (b) (d) Neither (a) nor (b)

35. A voltmeter connected in parallel to a resistor reads 0.1 volt. There is:
(a) Zero error (b) Positive error (c) Negative error (d) Both (b) & (c)

36. Which of the following is a non-renewable source of energy:
(a) Wood (b) Sun (c) Fossil fuels (d) Wind

SUMMATIVE ASSESSMENT –II

SCIENCE (Theory)

Class – X

(Solutions)

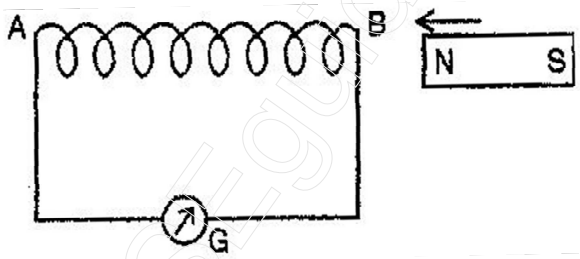
SECTION-A

1. When a chemical reaction occurs, new products are obtained.
2. Light reaction and Dark reaction.
3. Work done to carry a unit positive test charge from A to B is 1 Joule.
4. (a) Sulphurous acid is formed.

   $SO_2 + H_2O \longrightarrow H_2SO_3$ (Sulphurous acid}

   (b) Limewater turns milky due to formation of calcium sulphate.

   $SO_2 + Ca(OH)_2 \longrightarrow CaSO_3 + H_2O$
5. (i) Thyroxine hormone (ii) Calcitonine hormone
   (iii) Adrenaline hormone (iv) Vasopressin hormone
6. Connect a coil AB of wire having a number of turns. Connect it to a sensitive galvanometer as shown in figure.



   Move a bar magnet towards the coil. When North Pole is taken fast towards or South Pole is taken fast towards the coil, the deflection occurs in the galvanometer but will be in opposite direction. When the coil and magnet both are stationary, there is no deflection in the galvanometer. Thus the motion of a magnet, with respect to the coil, produces an induced potential difference which sets up an induced electric current in the circuit.
7. (a) $H_2 \longrightarrow 2H^+ + 2e^-$ (Oxidation)

   Substance getting oxidized is H_2.

   $Cl_2 + 2e^- \longrightarrow 2Cl^-$ (Reduction)

   Substance getting reduced is Cl_2.

   (b) $Cu^{2+} + 2e^- \longrightarrow Cu$ (Reduction)

   Substance getting reduced is Cu.

   $H_2 \longrightarrow 2H^+ + 2e^-$ (Oxidation)

   Substance getting oxidized is H_2.

   (c) $2S_2^{2-} \longrightarrow 2S + 4e^-$ (Oxidation)

   Substance getting oxidized is H_2S.

   $S^{4+} + 4e^- \longrightarrow S$ (Reduction)

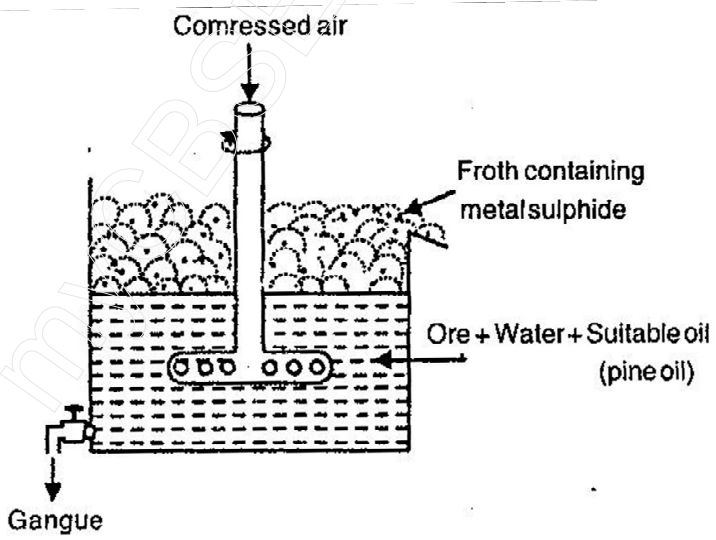
Substance getting reduced is SO_2.

8. It is a redox reaction because Ferrous $\left(Fe^{2+}\right)$ is getting oxidized to Ferric $\left(Fe^{3+}\right)$ whereas SO_4^{2-} is getting reduced to SO_2.

9. (a) $CaOCl_2$, Calcium oxychloride
   (b) $CaOCl_2 + CO_2 \longrightarrow CaCO_3 + Cl_2$
   (c) It is used as disinfectant in water treatment plants.

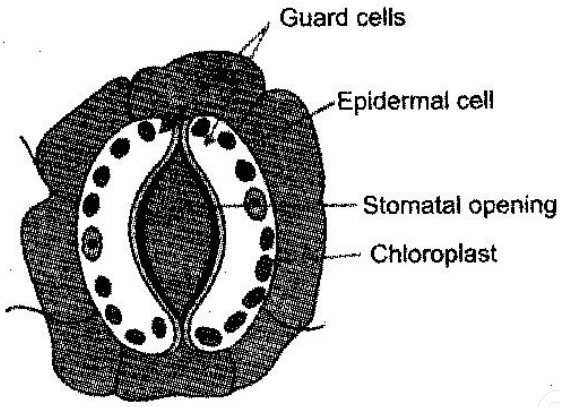
10. (a) No, he was wrong. Pure gold is very soft and is therefore not suitable for making jewellery. It is alloyed with either silver or copper to make it hard. But sometimes jewelers mix a large quantity of copper and silver in gold to earn more profit.
    (b) Untrustworthiness, cleverness.
    (c)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

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.



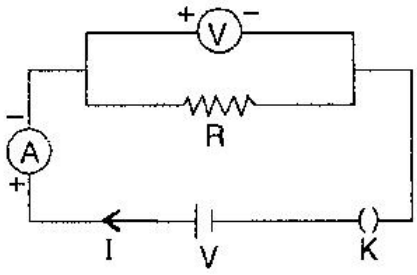
Froth floatation process.

12.

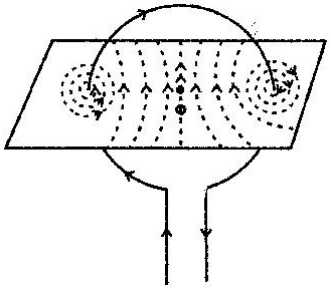


Open Stomata

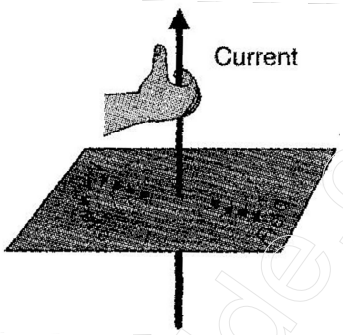
13. The functions of the following in the digestive process are:
    (a) **Bile**: Bile in the duodenum emulsifies fat present in the food, i.e. breaks fat molecules into small globules.
    (b) **Bicarbonate secreted by the duodenal wall**: Bicarbonate ions secreted by the duodenal wall mke the medium 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) Ohm's law: Under similar physical conditions, such as temperature remains constant, the current flowing through a wire is directly proportional to the difference in potential applied across its ends, i.e., $I \propto V$. or V = IR where R is the resistance offered.
    (b)



16. To detect the presence of the magnetic field created by the current in a circular loop at the centre, one can draw the magnetic field lines with the help of compass needle. The magnetic field lines appear as a straight line at the centre and other lines appear in the same direction without the loop.



Right hand thumb rule: Hold the wire in your right hand with your extended thumb pointing in the direction of current. Your folded fingers will indicate the direction of magnetic field around the wire.



17. (a) **Anaerobic decomposition**: The process in which the complex compound of cow dung slurry decomposes or breaks down in the absence of oxygen by anaerobic micro organisms called anaerobic bacteria is known as anaerobic decomposition.

Steps involved in obtaining biogas:

(i) Slurry is made by mixing of animal dung with an equal amount of water.

(ii) Slurry is passed through an inlet chamber of an underground digester tank.

(iii) In digester tank, slurry is decomposed by anaerobic bacteria in about 50-60 days to produce biogas.

(iv) The biogas collected in domes built over the digester tank and has a gas outlet with valve.

(v) The pressure exerted by the biogas on the slurry forces the spent slurry to the overflow tank via outlet chamber.

(vi) The spent slurry is periodically removed and used as a good manure.

(vii) The whole process is repeated again for regular supply of biogas.

(b) ${}^{235}_{92}U$ can undergo fission readily.

18. (a) Conversion efficiency is less.

(b) Approximately 15 km/h.

(c) The process in which the heavy Uranium nucleus splits into lighter nuclei of smaller atomic numbers is called Nuclear fission.

$${}^{235}_{92}U + {}^{1}_{0}n \longrightarrow {}^{141}_{56}Ba + {}^{92}_{36}Kr + 3{}^{1}_{0}n + Q$$

Q refers to the energy of 200 MeV released.

19. (a) Double displacement reaction, precipitation reaction.
(b) Combination reaction, oxidation reaction.
(c) Thermal decomposition
(d) Displacement reaction
(e) Combination and exothermic reaction

Or

(i) Silver is very less reactive metal. So it does not react with dilute HCl.
(ii) The reaction of Al with dilute HCl is exothermic i.e. heat is produced in the reaction, so the temperature of the reaction mixture rises.
(iii) Sodium is a very reactive metal. It react vigorously with the evolution of heat too.
(iv) Bubbles are seen due to the evolution of H_2 gas.

$$Pb(s) + 2HCl(aq) \longrightarrow PbCl_2 + H_2(g)$$

(v) CO_2 gas is produced when Na_2CO_3 reacts with dilute HCl.

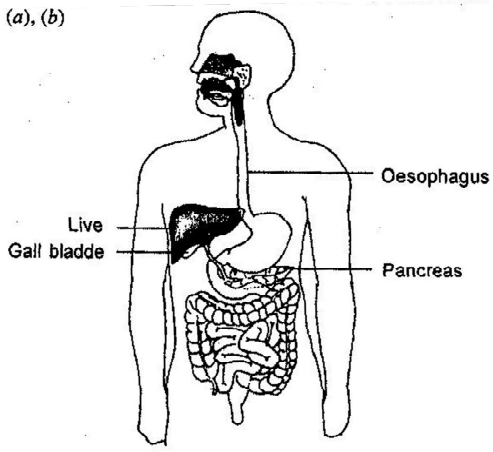
$$Na_2CO_3(s) + 2HCl(aq) \longrightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$$

20. (a) It is due to presence of free electrons.
(b) Metals are good reducing agents and H_2 is weak oxidizing agent therefore, metals do not react with hydrogen to form hydrides.
(c) $Zn + CuSO_4 \longrightarrow ZnSO_4 + Cu$
It is due to formation of $ZnSO_4$ (aq) which is colourless.
(d) It increases electrical conductivity and molten cryolite acts as a solvent.
(e) It prevents oxidation of food which prevents its spoilage.

Or

(a) Corrosion of metal is a process in which metal reacts with substances present in atmosphere to form surface compounds. 'Al' does not corrode whereas 'Fe' corrodes when placed in atmosphere.
(b) Take three test tubes and put iron nails in each of them. In the first test tube add H_2O up to brim and leave no space for air. In the second test tube add fused $CaCl_2$ so as to absorb moisture. In the third test add water and leave space for air. Leave them for few days.
Rusting will not take place in first and second test tubes. But rusting will take place in third test tube showing that rusting of iron requires both air and moisture.

21.

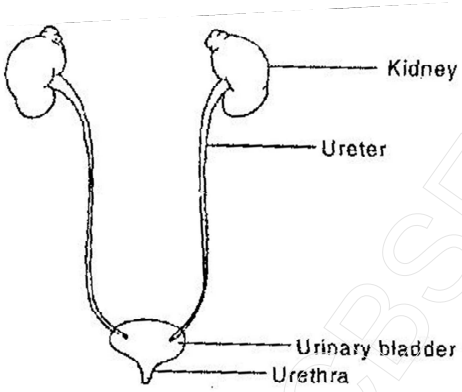


Alimentary Canal of Man

(c) The function of the enzyme 'pepsin' in the digestion process is that it breaks down proteins into peptones in acidic medium of gastric juice.

Or

(i)



Human Urinary System

(ii) The two major components of normal human urine are water and nitrogenous substances, most of which is urea.

22. (a) The earth wire helps us by offering a low resistance path to the high potential that might have come in contact with the body or other unwanted part of the device. This will not bring any damage to the device or to the person handling the device. The fuse may disconnect the electrical link in such cases.

(b) Overloading is the situation which causes a sudden draw of larger current by the electrical appliances, when operated at the same time from a single parallel connection.
In short-circuit the live wire comes in contact with the neutral line. This gives a large drop of potential and flow or current through the fuse wire. So it burns.

(c) (i) 5 A (ii) 15 A

Or

(a) **Ohm's law**: The electrical current (I) flowing through a metallic wire is directly proportional to the potential difference (V) across its ends provided the physical conditions like temperature remains constant.

Mathematically: $V \propto I \quad \Rightarrow \quad V = IR$

(b) **Aim**: To establish the relationship between potential difference across the resistor and current passing through it.

Apparatus required: Nichrome or eureka wire (length 0.5 m) , an ammeter, a voltmeter and four cells if 1.5 V each.

Procedure:

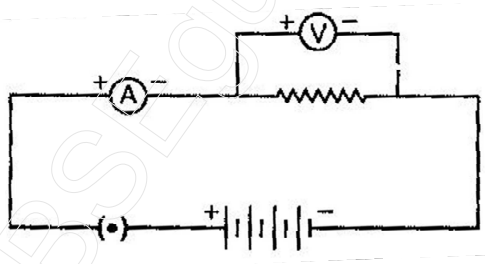
(i) Set the circuit as shown in the figure.

(ii) First use only one cell as the source and note the reading of the ammeter and voltmeter.

(iii) Now connect two cells in series and note the reading of the ammeter and voltmeter again.

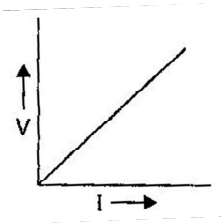
(iv) Now connect three cells in series in the circuit and again take the reading of both devices.

(v) Lastly connect fourth cell in series in the circuit also note the reading of the ammeter and voltmeter again.



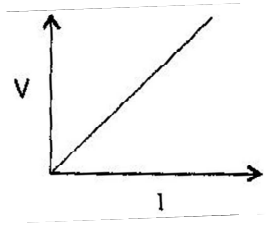
Observation: In this activity, we will observe that the current increases with potential difference, i.e. more cells being connected in series. We will get approximately the same value for $\frac{V}{I}$ in each case and we will also obtain straight line graph of V vs I passing through the origin as shown in figure. From the graph, we observe that

$\frac{V}{I}$ = constant, i.e. V = constant x I or $V \propto I$



Conclusion: The constant is called Resistance. If we change the wire, the graph will vary but remain a line with a different slope/resistances.

(c) Shape of the V-I curve is a straight line passing through the origin as shown in figure.



23. (a) **Magnetic field**: Surrounding a magnet its influence is felt by any other magnetic element. It may be an attractive of a repulsive influence.

(b) The direction of magnetic field at a point is determined by drawing a tangent at that point. The direction of tangent gives the direction of magnetic field.

(c) **Aim**: To demonstrate the direction of the magnetic field generated around a current carrying conductor.

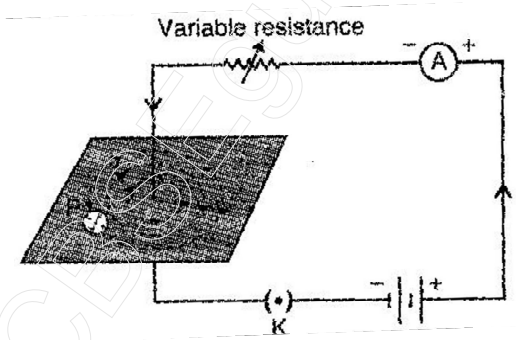
Procedure:

(i) Obtain the concentric circles pattern of iron fillings around the copper wire by flowing current through it as shown.

(ii) Place a magnetic needle (compass) at any point (P) over a circle.

(iii) Observe the direction of needle.

(iv) Show the direction by arrows.



Conclusion: The direction of the north pole of the compass needle would give the direction of the field lines produced by the electric current through the straight wire at that point.

(d) The direction of the field is perpendicular to the plane of the coil and directed inwards for the clockwise current flowing. For anticlockwise current, it will be outwards.

Or

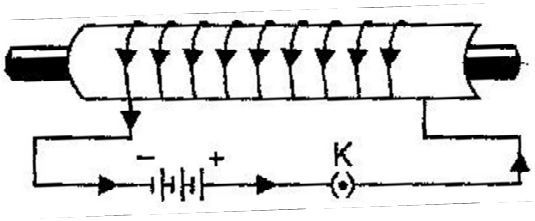
(a) **Magnetizing a material**: When a material like soft iron, is placed inside a coil carrying current (may be a solenoid), it will get magnetized. Once the current is put-off, the magnetic field will also be lost. Such magnets are called electromagnets.

(b) **Two uses of electromagnet**:

(i) In electric bells.

(ii) For sorting scrap metal.

(c)



(d) The purpose of soft iron core used in making an electromagnet that:
(i) It is temporary magnetized.
(ii) It retains magnetism as long as current flow is maintained.
(iii) It will ensure an uniform and stronger field.

24. (a) Renewable sources of energy are those that can be used without depleting their reserves and do not get exhausted. E.g., solar energy, wind energy, hydro energy etc.
Non-renewable sources of energy are those which cannot be replenished and exhausted with the passage of time, e.g. coal, petroleum and natural gas.
(b) Wood is not advisable used as a fuel, although forests can be replenished due to the following reasons:
(i) Burning of wood causes pollution.
(ii) The left-over residue after combustion have a disposed off problem.
(iii) Smoke produced by burning of wood causes health hazard.
(iv) Wood is a less heat generating fuel.
(v) Trees are essential for our life as they absorb CO_2 and give out O_2.

Or

(a) It is because a piece of fresh wood is not dry and therefore it is to be heated at high temperature before it catches fire that is why it is difficult to burn.
(b) It cuts off the supply of air (oxygen) which is required for combustion to take place.
(c) Hydrogen is highly combustible and burns with an explosion, therefore, it is difficult to store and transport.
(d) Charcoal, has higher calorific value than wood and produces less smoke than wood.

25. 'A' is HCl because it turns blue litmus red and liberates H_2 with Zinc and CO_2 with Na_2CO_3.

$$Zn + 2\ HCl \longrightarrow ZnCl_2 + H_2$$

$$Na_2CO_3 + 2HCl \longrightarrow 2NaCl + CO_2 + H_2O$$

'B' is NaOH because it turns red litmus blue and liberates H_2 gas with Zinc metal.

$$Zn + 2\ NaOH \longrightarrow Na_2ZnO_2 + H_2$$

$$Na_2CO_3 + NaOH \longrightarrow \text{No reaction}$$

26. (a) Scotoactive
(b) Due to deficiency of oxygen, in most plants, stomata opens at night, e.g., Opuntia, Bryophyllum.

27. Key used in electric circuit should be kept off to avoid heating of the resistor because heating changes resistance.
28. (a)
29. (a)
30. (a)
31. (a)
32. (a)
33. (a)
34. (c)
35. (b)
36. (c)