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. Why does milk become sour if kept for a long time?
2. Name the respiratory organs of: (i) fish, (ii) mosquito, (iii) earthworm.
3. Name a metal which offers higher resistance to the passage of electricity other than copper.
4. (i) An aqueous solution has a pH value of 7.0. Is this solution acidic, basic or neutral?
   (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. A wire carrying current is passing through a hole at the middle of a cardboard. Plot the magnetic field lines.
7. What information can be included in a chemical reaction?
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. State reasons for the following:

(a) Metals are good conductors of heat.
(b) Addition of some silver to pure gold for making ornaments.
(c) Inability of non-metals for displacing hydrogen from dilute sulphuric acid.

12. Name the three kinds of cells present in blood. Write one function each of them.
13. Draw a diagram of human alimentary canal showing duodenum, small intestine, liver and pancreas.
14. Draw a diagram of human brain and label the following parts:
    (a) Cerebrum (b) Meninges (c) Medulla oblongata (d) Cerebellum
15. Vikalp's father had constructed a new room in their house. An electrician was called in to do the electric wiring. The electrician was asked to do wiring for two fans, two bulbs, a light socket and a power socket. Vikalp studies in tenth standard. Just when the electrician had completed the wiring, Vikalp returned home from school. Vikalp wanted to check the wiring by using all the switches and sockets. Vikalp found that the two fans and two sockets worked properly, each having a separate switch but there was a problem in the working of bulbs. Both the bulbs could be switched on and switched off with the same switch. Vikalp explained the mistake in wiring to electrician and then two separate switches were provided for the two bulbs.

    Read the above passage and answer the following questions:
    (a) In what way were the two fans and two sockets connected in the household circuit by electrician?
    (b) What mistake made by the electrician in connecting two bulbs in the circuit?
    (c) What values were displayed by Vikalp during this incident?

    [Value Based Question]
16. Draw the pattern of field lines due to a bar magnet. Mention any two properties of the magnetic field lines.
17. (a) Name the device used to convert:
        (i) Solar energy into heat and
        (ii) Solar energy into electricity.
    (b) Explain the principle of working of a wind mill.
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 equations for the following reactions:
    (i) Calcium hydroxide + Carbon dioxide $\longrightarrow$ Calcium carbonate + Water
    (ii) Zinc + Silver nitrate $\longrightarrow$ Zinc nitrate + Silver
    (iii) Aluminium + Chromium oxide $\longrightarrow$ Aluminium oxide + Chromium
    (iv) Barium chloride + Potassium sulphate $\longrightarrow$ Barium sulphate + Potassium chloride
    (v) Hydrogen + Chlorine $\longrightarrow$ Hydrogen chloride

    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. Define the terms 'Nutrition' and 'Nutrients'. List two differences between 'Holozoic nutrition' and 'Saprophytic nutrition'. Give two examples of each of these two types of nutrition.

    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. State 'Fleming's Right hand rule'. With a labelled diagram, describe the working of an A.C. electric generator.

    Or

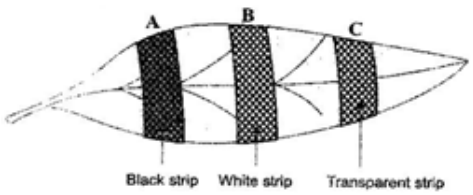
    Explain with neat and labelled diagram, the principle, construction and working of D.C. generator, showing the output.
24. Draw the line of forces (indicating field direction) of the magnetic field through and around (a) a single loop wire carrying electric current and (b) a solenoid carrying electric 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. When red litmus paper is added to limewater, then what will be the change in litmus paper? Give reason. Write the chemical formula of limewater also.
26. A destarched leaf on a potted plant was covered with black (A), white (B) and transparent (C) strips of paper as shown in the figure.

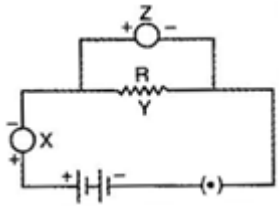


After six hours to exposure to sunlight the leaf was removed from the plant and tested for starch.

(a) What changes will be observed?

(b) Justify your answer.

27. A student draw the following circuit diagram for the experiment on studying the dependence of current (I) on potential difference (V) across a resistor. What are the parts labelled X, Y and Z in this diagram respectively? Justify your answer also.



28. When the colour of pH paper becomes red, the solution is _____ and pH is between _____.

(a) strongly acid, pH = 1 to 2 (b) weakly acid, pH = 6 to 7

(c) strongly basic, pH = 12 to 13 (d) weakly basic, pH = 7 to 8

29. When SO_2 gas is passed through acidified $K_2Cr_2O_7$ solution:

(a) The solution becomes green due to formation of K_2SO_4.

(b) The solution becomes green due to formation of $Cr_2(SO_4)_2$.

(c) The solution becomes yellow due to formation of K_2SO_4.

(d) The solution becomes red due to formation of $Cr_2(SO_4)_2$.

30. SO_2 gas should not be inhaled because:

(a) It is poisonous.

(b) It is acidic in nature.

(c) It is lighter than air.

(d) It is pungent smelling.

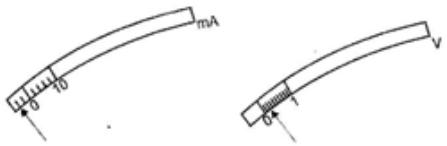
31. Growth hormone : Pituitary : Thyroxin : _____

(a) Thyroid (b) Parathyroid (c) Pancreas (d) Adernal

32. How many spinal nerves are present in human being:

(a) 31 pairs (b) 19 pairs (c) 27 pairs (d) 30 pairs

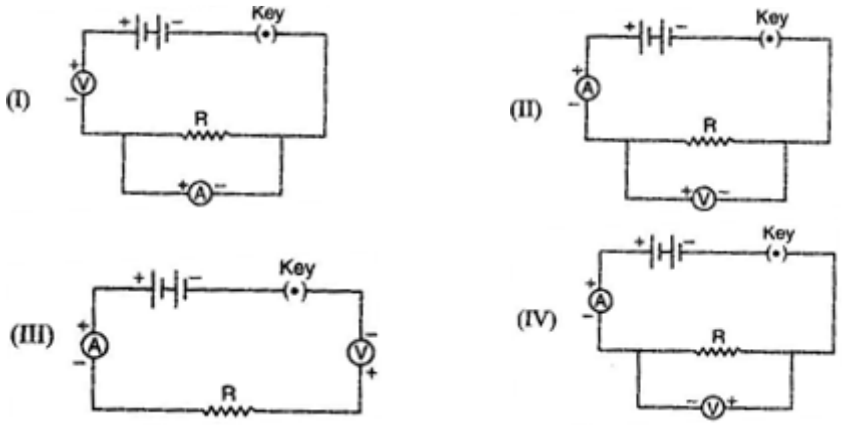
33. The rest positions of the needles in a Milliammeter and Voltmeter when not being used in a circuit are as shown in the figure. The 'zero error' and 'least count' of these two instruments are:



(a) (+4 mA, –0.2 V) and (1 mA, 0.1 V) respectively

(b) (+4 mA, –0.2 V) and (2 mA, 0.2 V) respectively
(c) (–4 mA, +0.2 V) and (2 mA, 0.2 V) respectively
(d) (–4 mA, +0.2 V) and (2 mA, 0.1 V) respectively

34. While performing the experiment on studying the dependence of current (I) on the potential difference (V) across a resistor, four students I, II, III and IV set up the circuit is shown.



The correct result will be obtained by the student.
(a) I (b) II (c) III (d) IV

35. If the key in the arrangement is taken out (the circuit is made open) and magnetic field lines are drawn over the horizontal plane, the lines are:
(a) concentric circles.
(b) elliptical in shape.
(c) straight lines parallel to each other.
(d) concentric circles near the point O but of elliptical shapes as we go away from it.

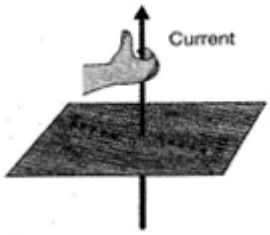
36. Fuel used in thermal power plants is:
(a) water (b) uranium (c) biomass (d) fossil fuels

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

(Solutions)

SECTION-A

1. It gets spoiled due to chemical reaction taking place in it. Calcium lactate changes to lactic acid which is sour in taste.
2. Fish – Gills Mosquito – Air tubes or trachea Earthworm – skin
3. Mercury or Aluminium or Gold or Tungsten
4. (i) It is neutral.
   (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. I – Current (upwards)
   Field lines – Anticlockwise.



7. The following information can be included in a chemical equation or reaction:
   (i) The physical state of substances can be specified as $(s),(l),(g),(aq)$ for solids, liquids, gases or aqueous solutions respectively, e.g.,
   $$3Fe(s) + 4H_2O(l) \longrightarrow Fe_3O_4(s) + 4H_2(g)$$
   (ii) A reversible reaction is a reaction, which can proceed in both forward and backward directions. In other words, the reactants give products and products give reactants back simultaneously, e.g.,
   $$N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$$
   (iii) The conditions in which reaction takes place should be included, e.g.,
   $$H_2(g) + Cl_2(g) \xrightarrow[\text{light}]{\text{Sun}} 2HCl(g)$$
   (iv) The concentration of reacting substances can be mentioned, e.g.,
   $$Cu(s) + 2H_2SO_4(conc.) \xrightarrow{\text{Heat}} CuSO_4(s) + SO_2(g) + 2H_2O(l)$$

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.

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

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.

    $HgS + O_2 \longrightarrow Hg + S_2$

    Cinnabar Oxygen Mercury Sulphur dioxide

11. (a) It is due to presence of free electrons or mobile electrons.

    (b) It is done so as to increase hardness of gold.

    (c) It is because non-metals can't supply electrons so as to convert H^+ into hydrogen gas.

12. The three kinds of cells present in blood are:

    (a) Red blood corpuscles.

    (b) White blood corpuscles.

    (c) Blood platelests.

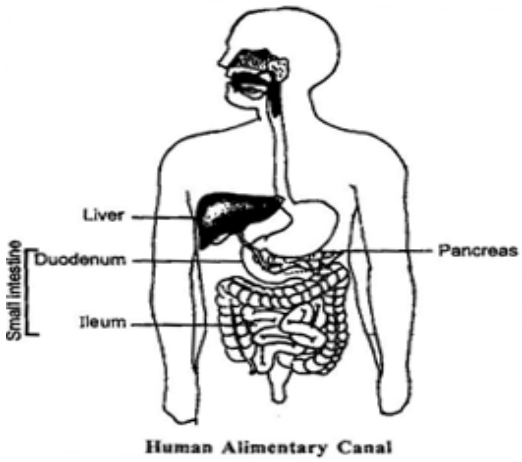
    Functions of each of them are:

    (i) Red blood corpuscles contain haemoglobin that combines with oxygen to form oxyhaemoglobin which is transported to the tissues of the body for the purpose of respiration.

    (ii) **White blood corpuscles** protect the body from infections. They manufacture antibodies which are responsible for immunity.

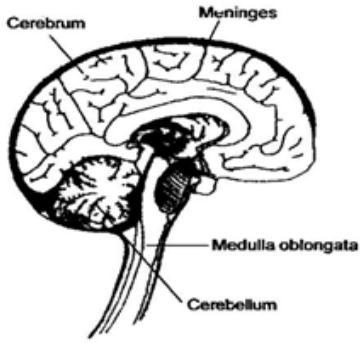
    (iii) **Blood platelests** help in the coagulation of blood, thus preventing the further loss of blood in case of injury.

13.



Human Alimentary Canal

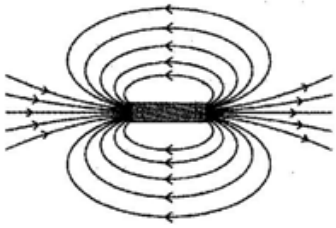
14.



Human Brain

15. (a) The two fans and two sockets were connected correctly in parallel circuits.
    (b) The two electric bulbs were connected wrongly in series in the circuit.
    (c) Vikalp showed the values of (i) Curiosity to check whether things worked properly or not (ii) Knowledge of household wiring and (iii) Application of knowledge.

16. The following figure shows the pattern of field lines due to a bar magnet:



    Two properties of magnetic field lines:
    (i) The magnetic field lines forma closed continuous loop.
    (ii) Tangent gives the direction of field.

17. (a) (i) Solar energy into heat – Solar cooker
        (ii) Solar energy into electricity – Solar cell
    (b) Principle of working of a wind mill: When the blowing air strikes across the special design blades of a windmill, blade starts rotating. This rotation is due to the pressure difference between the difference regions thereby exert a force on the blades. The speed of rotation, however, may increase or decrease depending upon the wind velocity at that places.

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^{o} 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) $Ca(OH)_2(aq) + CO_2(g) \longrightarrow CaCO_3(s) + H_2O(l)$

(ii) $Zn(s) + 2AgNO_3(aq) \longrightarrow Zn(NO_3)_2(aq) + 2Ag(s)$

(iii) $2Al(s) + Cr_2O_3(s) \longrightarrow Al_2O_3(s) + 2Cr(s)$

(iv) $BaCl_2(aq) + K_2SO_4(aq) \longrightarrow BaSO_4(s) + 2KCl(aq)$

(v) $H_2(g) + Cl_2(g) \longrightarrow 2HCl(g)$

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 Permanganate (purple) — Sulphur dioxide — Potassium sulphate (colourless) — Manganese sulphate (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.

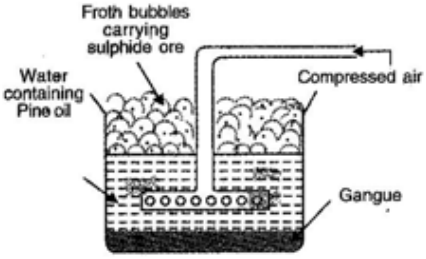
Four methods of enrichment of ores are:

(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. **Nutrition**: It can be defined as the process by which the organism ingests, digests, absorbs, transports and utilizes nutrients and disposes off their end products. It can also be defined as 'Food at work in the body."

Nutrients: These are those substances which supply nourishment to living organisms from its surroundings and use it as an energy source or for biosynthesis of body constituents.

Difference between Holozoic Nutrients and Saprophytic Nutirtion:

Holozoic Nutrition	Saprophytic Nutrition
(i) In holozoic nutrition, solid food is broken into simpler soluble forms by the action of digestive enzymes. (ii) This type of nutrition takes place in four steps namely, ingestion, digestion, absorption and egestion. Examples: Amoeba and Human beings	(i) In saprophytic nutrition, the organisms obtain nutrients from the dead and decaying organic matter. (ii) This type of nutrition takes place by absorption of body surface. Examples: Fungi and Bacteria

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.

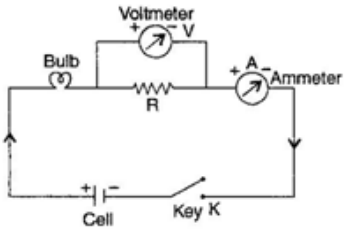
(b) Green light is least useful in photosynthesis because the chlorophyll pigment reflects it back.

(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.

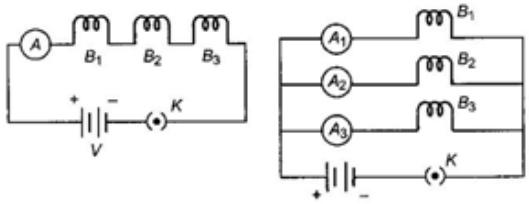
From his observation, it is shown that chlorophyll is necessary for photosynthesis in plants.

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,

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

$\therefore$ Power consumption of each bulb in series combination.

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

For parallel circuit,

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

($\because$ same voltage in parallel combination)

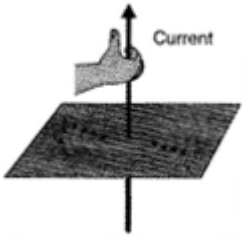
$\therefore$ Power consumption of each bulb in parallel combination $P_2 = \frac{V^2}{3R}$ .....(ii)

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

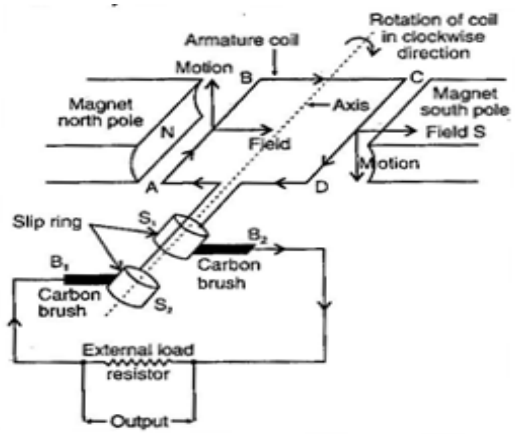
Therefore, each bulb in parallel combination glow 3 times brighter to that of each bulb in series combination.

(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. **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.



AC electric generator produces potential which reverses after every 180° rotation of the coil.

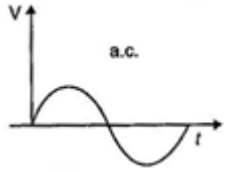


Working of an A.C. generator:

When the armature coil ABCD rotates in the magnetic field, with the help of some external mechanical work in clockwise direction i.e. arm AB moves up and CD moves down, due to change in the magnetic flux, induce current sets up in the coil. Then according to Fleming's right-hand rule, the current is flowing in the direction ABCD.

After half rotation, CD starts moving up and AB moves down. Hence net induced current in the direction DCBA.

Thus after every half rotation, the polarity of the induced emf thereby induced current across the load resistance changes. Therefore in the external circuit, we get alternating current.



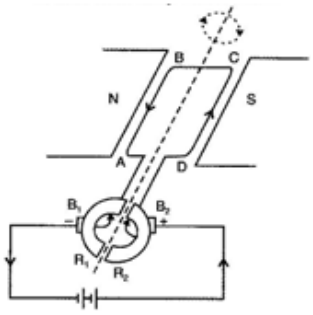
Or

D.C generator: D.C generator means the generator which produces unidirectional current.

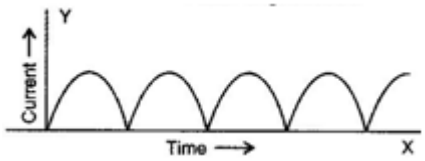
Principle of D.C. Generator: It is also based on the principle of electromagnetic induction.

Construction: Similar to AC generator. In DC generator, we use 'split ring commutator as shown in figure instead of slip ring commutator, which is used in A.C. generator.

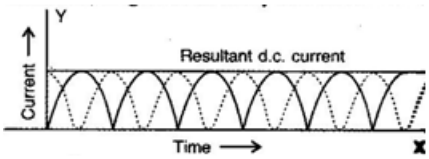
Working: The change in the magnetic flux in the rotating coil sets up an induced emf across the end of the coil. With the help of split ring commutator, one carbon brush is at all times in contact with the arm moving up while the other is in contact with the arm moving down. Due to this arrangement, current in the external circuit flows in the same direction, although induced emf in the coil is reversed after every half rotation.



Thus unidirectional current is produced.

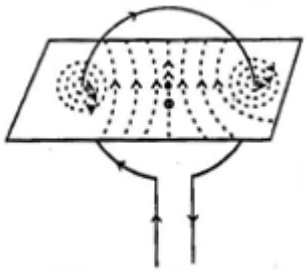


If several coils inclined at equal angles to one another and a commutator with corresponding number of segments in it are used, we get almost steady current as shown in figure.

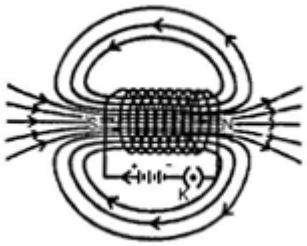


24.

(a)

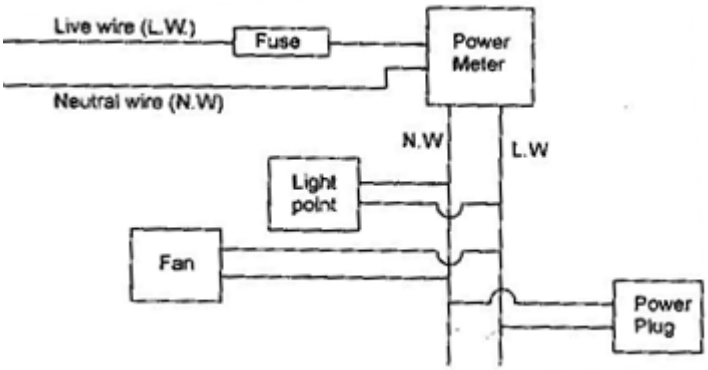


(b)



Or

(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.

25. The colour of litmus paper will be changed into blue because limewater is a base which turns red litmus blue. The chemical formula of limewater is $Ca(OH)_2$.
26. (a) Only A and B portions remained colourless and the rest of the leaf turned blue-black.
    (b) Portion of leaf covered with opaque paper does not get sunlight.
27. The respectively parts are s milliammeter, a resistor and a voltmeter because Ammeter (X) in series and voltmeter (Z) in parallel to the resistor (Y).

28. (a)
29. (b)
30. (a)
31. (a)
32. (a)
33. (d)
34. (b)
35. (c)
36. (d)