SCIENCE
CLASS X (THEORY)
SAMPLE QUESTION PAPER-II

Time : 3 Hours **Maximum Marks : 75**

Multiple Choice Questions

1. Which among the following statement(s) is(are) true? Silver chloride on exposure to sunlight for long duration turns grey due to

(i) the formation of silver by decomposition of silver chloride
(ii) sublimation of silver chloride
(iii) decomposition of chlorine gas from silver chloride
(iv) oxidation of silver chloride

(a) (i) only
(b) (i) and (iii)
(c) (ii) and (iii)
(d) (iv) only (1)

2. Which of the following oxide(s) of iron would be obtained on prolonged reaction of iron with steam?

(a) FeO
(b) Fe_2O_3
(c) Fe_3O_4
(d) Fe_2O_3 and Fe_3O_4 (1)

3. $CH_3\ CH_2\ OH \xrightarrow{\text{Alkaline } KMnO_4 + \text{Heat}} CH_3\ COOH$

In the above given reaction, alkaline $KMnO_4$ acts as

(a) reducing agent
(b) oxidising agent
(c) reducing as well as oxidising agent
(d) dehydrating agent (1)

4. Which of the following gives the correct increasing order of the atomic radii of O, F and N?

(a) O, F, N
(b) N, O, F
(c) O, N, F
(d) F, O, N (1)

5. Which of the following statement(s) is(are) true about heart?

(i) Left atrium receives oxygenated blood from different parts of the body while right atrium receives deoxygenated blood from lungs

(ii) Left ventricle pumps oxygenated blood to different body parts while right ventricle pumps deoxygenated blood to lungs

(iii) Left atrium transfers oxygenated blood to right ventricle which sends it to different parts of the body

(iv) Right atrium receives deoxygenated blood from different parts of the body while left ventricle pumps oxygenated blood to different parts of the body

(a) (i) (b) (ii)

(c) (ii) and (iv) (d) (i) and (iii) (1)

6. The substance that triggers the fall of mature leaves and fruits from plants is

(a) Auxin

(b) Gibberellin

(c) Abscisic acid

(d) Cytokinin (1)

7. Which among the following statements are true for unisexual flowers?

(i) They possess both stamen and pistil

(ii) They possess either stamen or pistil

(iii) They exhibit cross pollination

(iv) Unisexual flowers possessing only stamens cannot produce fruits

(a) (i) and (iv) (b) (ii), (iii) and (iv)

(c) (iii) and (iv) (d) (i), (iii) and (iv) (1)

8. According to the evolutionary theory, formation of a new species is generally due to

(a) sudden creation by nature

(b) accumulation of variations over several generations

(c) clones formed during asexual reproduction

(d) movement of individuals from one habitat to another (1)

9. Under which of the following conditions the real image formed by a concave mirror is larger than the actual object?

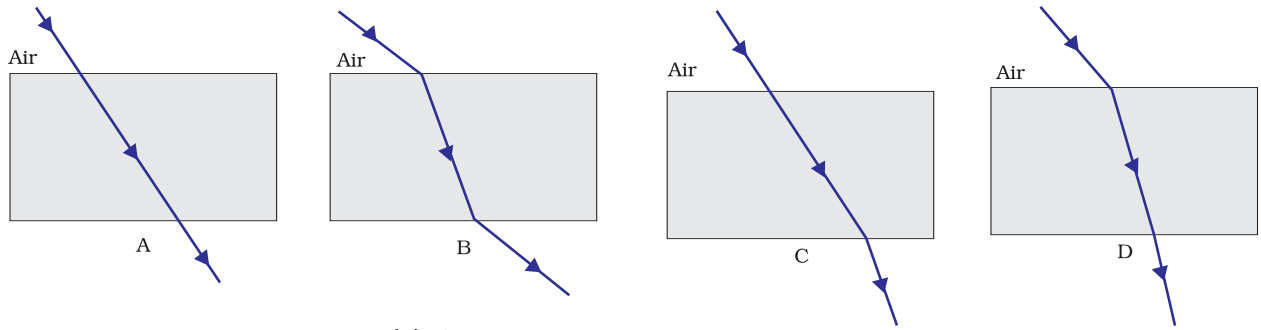
(a) When source is at a distance equal to radius of curvature of the concave mirror

(b) When source is at a distance less than the focal length of the concave mirror

(c) When source is placed at a distance between the focus and centre of curvature of the concave mirror

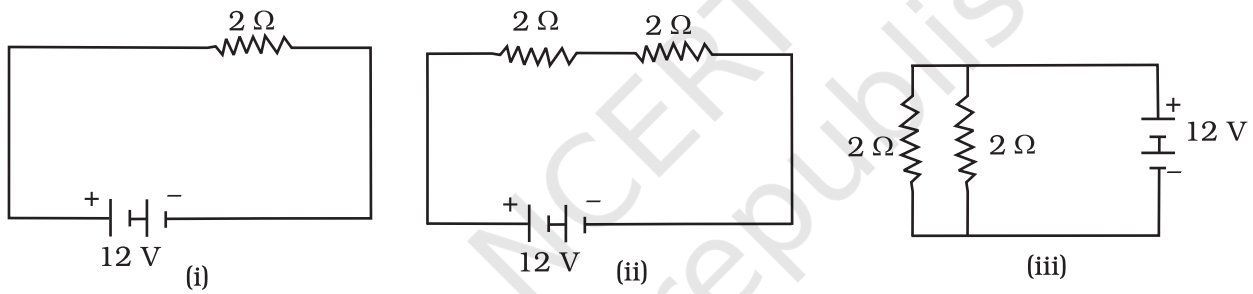
(d) When source is placed at a distance greater than the radius of curvature of the concave mirror (1)

10. The path of a ray of light passing through a rectangular glass slab tested by four students are shown in Figure as A, B, C and D. Which one of them is correct?



(a) A
(b) B
(c) C
(d) D (1)

11. In the following given circuits, heat produced in the resistor or combination of resistors connected to a 12 V battery will be



(a) same in all the cases.
(b) minimum in case (i).
(c) maximum in case (ii).
(d) maximum in case (iii). (1)

12. What is the maximum resistance which can be made using five resistors each of 1/5 Ω?

(a) 1/5 Ω
(b) 10 Ω
(c) 5 Ω
(d) 1 Ω (1)

13. In an electrical circuit three incandescent bulbs A, B and C of rating 40 W, 60 W and 100 W are connected in parallel to an electric source. Which of the following is likely to happen regarding their brightness?

(a) Brightness of all the bulbs will be the same

(b) Brightness of bulb A will be the maximum

(c) Brightness of bulb B will be more than that of A

(d) Brightness of bulb C will be less than that of B (1)

14. Choose the incorrect statement

(a) Fleming's right-hand rule is a simple rule to know the direction of induced current

(b) The right-hand thumb rule is used to find the direction of magnetic fields due to current carrying conductors

(c) The difference between the direct and alternating currents is that the direct current always flows in one direction, whereas the alternating current reverses its direction periodically

(d) In India the AC changes direction after every $\frac{1}{50}$ second (1)

15. Among the statements given below select the ones that describe the concept of sustainable development

(i) Planned growth with minimum damage to the environment

(ii) Growth irrespective of the extent of damage caused to the environment

(iii) Stopping all developmental work to conserve the environment

(iv) Growth that is acceptable to all the stakeholders

(a) (i) and (iv)

(b) (ii) and (iii)

(c) (ii) and (iv)

(d) (iii) only (1)

Short Answer Questions

16. Identify the oxidising agent (oxidant) in the following reactions

(a) $Pb_3O_4 + 8HCl \longrightarrow 3PbCl_2 + Cl_2 + 4H_2O$

(b) $Mg + 2H_2O \longrightarrow Mg(OH)_2 + H_2$

(c) $CuSO_4 + Zn \longrightarrow Cu + ZnSO_4$

(d) $V_2O_5 + 5Ca \longrightarrow 2V + 5CaO$ (½+½+½+½=2)

17. A non-metal A is an important constituent of our food and forms two oxides B and C. Oxide B is toxic whereas C causes global warming

(a) Identify A, B and C

(b) To which Group of periodic table A belongs? (1½+½=2)

18. Atomic number of a few elements are given below

(i) 10 (ii) 20

(iii) 7 (iv) 14

(a) Identify the elements

(b) Identify the period to which these elements belong

(1 + 1 = 2)

19. What will happen if the mucus is not secreted by the gastric glands? (2)

20. Name the plant hormones responsible for the following

(a) elongation of cells

(b) growth of stem

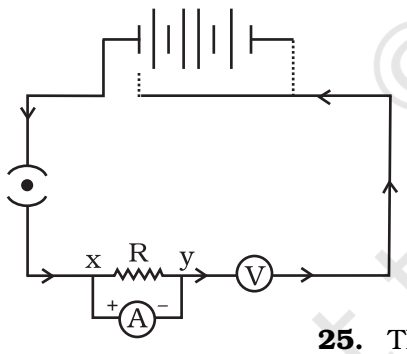
(c) promotion of cell division

(d) falling of senescent leaves (½ + ½ + ½ + ½ = 2)

21. How are general growth and sexual maturation different from each other? (2)

22. A very small population of a species faces a greater threat of extinction. Provide a suitable genetic explanation. (2)

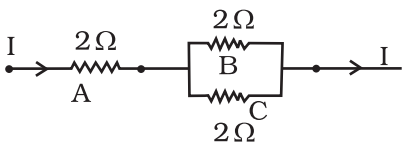
23. It is established that an electric current through a metallic conductor produces a magnetic field around it. Is there a similar magnetic field produced around a thin beam of moving (i) positively charged alpha particles, (ii) neutrons? Justify your answer by giving suitable arguments. (1 + 1 = 2)



24. A child has drawn the electric circuit to study Ohm's law as shown in the figure. His teacher told that the circuit diagram needs correction.

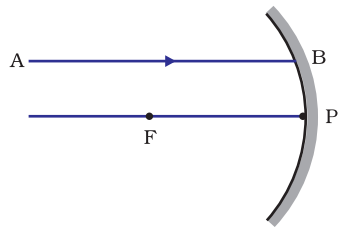
Study the circuit diagram and redraw it after making all corrections. (2)

25. Three 2 Ω resistors, A, B, and C, are connected as shown below. Each of them dissipates and can stand a maximum power of 18 W without melting. Find the maximum current that can flow through the three resistors.



(2)

26. Draw the reflected ray corresponding to the ray incident on a concave mirror as shown in the ray diagram? (2)



27. Why does a light ray incident on a rectangular glass slab immersed in any medium emerge parallel to itself? Explain using a diagram. (2)

28. A person needs a lens of power –4.5 D for correction of her vision.
(a) What kind of defect in vision is she suffering from?
(b) What is the focal length of the corrective lens?
(c) What is the nature of the corrective lens? (2)

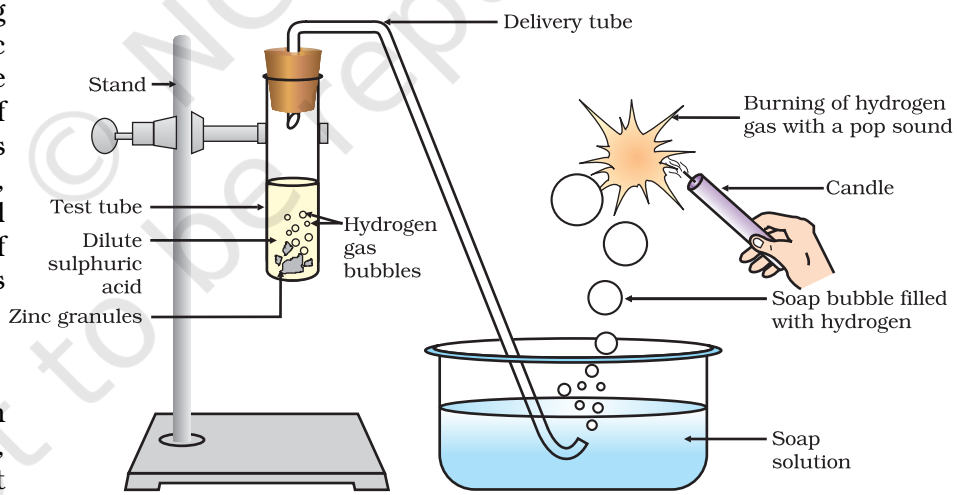
29. In a village in Karnataka, people started cultivating crops all around a lake which was always filled with water. They added fertilisers to their field in order to enhance the yield. Soon they discovered that the waterbody was completely covered with green floating plants and fish in the lake started dying in large numbers.

Analyse the situation and give reasons for excessive growth of plants and death of fishes in the lake. (2)

30. Although coal and petroleum are produced by degradatioin of bio- mass, yet we need to conserve them. Why? (2)

Long Answer Questions

31. In the following schematic diagram for the preparation of hydrogen gas as shown in Figure, what would happen if following changes are made?



(a) In place of Zn granules, same amount of zinc dust is taken in the test tube
(b) Instead of dilute sulphuric acid, dilute hydrochloric acid is taken
(c) In place of Zn, Cu turnings are taken
(d) Sodium hydroxide is taken in place of sulphuric acid and tube is heated (1½+1½+1+1=5)

or

A metal carbonate X on reacting with an acid gives a gas which when passed through a solution Y gives the carbonate back. On the other hand, a gas G that is obtained at anode during electrolysis of brine is passed on dry Y, it gives a compound Z, used for disinfecting drinking water. Identity X, Y, G and Z. Also, write the chemical reactions involved. (5)

32. When ethanoic acid reacts with sodium hydrogencarbonate, a salt X is formed and a gas Y is evolved.

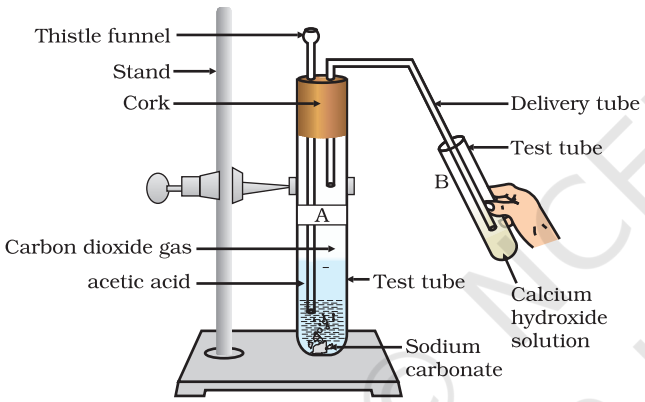
(a) Identify X and Y. Write chemical equation of reaction involved.

(b) Describe an activity and draw the diagram of the apparatus to prove that the evolved gas is the one which you have named.

(2 + 2 +1 = 5)

or

Look at Figure and answer the following questions.



(a) What change would you observe in tube B containing calcium hydroxide solution

(b) Write the reaction involved in test tubes A and B respectively

(c) If ethanol is given instead of acetic acid, would you expect the same change?

(d) How can a solution of lime water be prepared in the laboratory?

(1+2+1+1 = 5)

33. When do we consider a person to be myopic or hypermetropic? Explain using diagrams how the defects associated with myopic and hypermetropic eye can be corrected? (5)

or

Explain the refraction of light through a triangular glass prism using a labelled ray diagram. Hence define the angle of deviation. (5)

34. How can solar energy be harnessed? What are the limitations in using solar energy? How are these limitations overcome?

(1½+1½+2= 5)

or

What is biomass? Explain the principle and working of a biogas plant using a labelled schematic diagram (2+3 = 5)

35. Explain with the help of a labelled diagram the distribution of a magnetic field due to a current through a circular loop. Why is it that if a current carrying loop has *n* turns the field produced at any point is *n* times as large as that produced by a single turn?

(2½+2½ = 5)

or

Explain the phenomenon of electromagnetic induction? Describe an appropriate experiment to show that a current is set up in a closed loop when an external magnetic field passing through the loop increases or decreases. (2 + 3 = 5)

36. Suggest any five activities in daily life which are eco-friendly. (5)

or

Explain some harmful effects of agricultural practices on the environment. (5)

ANSWERS

Multiple Choice Questions

1. (a)

2. (c)

3. (b)

4. (d)

5. (c)

6. (c)

7. (b)

8. (b)

9. (c)

10. (b)

11. (d)

12. (d)

13. (c)

14. (d)

15. (a)

Short Answer Questions

16. (a) Pb_3O_4

(b) H_2O

(c) $CuSO_4$

(d) V_2O_5

17. (a) A is carbon, B is carbon monoxide and C is carbon dioxide

(b) Group 14 of periodic table

18. (a) Ne, Ca, N, Si

(b) 2, 3 , 2, 3

19. Gastric glands in stomach release hydrochloric acid, enzyme pepsin and mucus. The mucus protects the inner lining of the stomach from the action of hydrochloric acid and enzyme pepsin. If mucus is not released, it will lead to erosion of inner lining of stomach, which may cause acidity and ulcer.

20. (a) Auxin

(b) Gibberellin

(c) Cytokinin

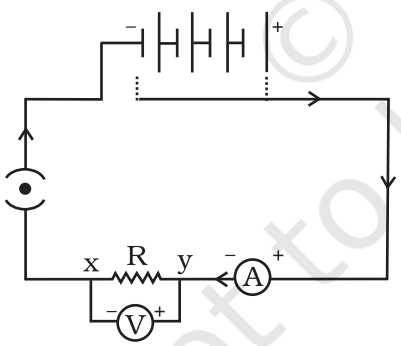
(d) Abscisic acid

21. General growth refers to different types of developmental process in the body like increase in height, weight gain, changes in shape and size of the body but sexual maturation is specific to changes reflected at puberty like cracking of voice, new hair patterns, development of breast in female etc.

22. Fewer individuals in a species impose extensive inbreeding among them. This limits the appearance of variations and puts the species at a disadvantage if there are changes in the environment. Since the individuals fail to cope up with the environmental changes, they may become extinct.

23. **Hint—**(i) Yes, (ii) No. Alpha particles are positively charged particles and therefore a thin beam of moving alpha particles constitutes a current in the direction of motion of the alpha particles. The neutrons on the other hand are electrically neutral and therefore there is no current associated with the thin beam of moving neutrons.

24.

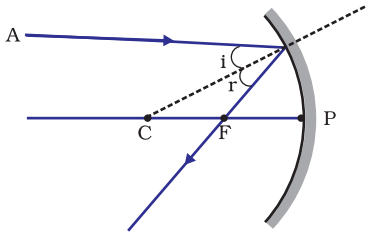


25. Maximum current through resistor A = $\sqrt{\frac{18}{2}}$ A = 3 A.

Thus the maximum current through resistors B and C, each

= $3 \times \frac{1}{2}$ A = 1.5 A.

26.



27. **Hint—** Draw the diagram and explain using laws of refraction at both interfaces.

28. (a) Myopia (b) – 0.22 m (c) Concave Lens

29. **Hint—** Since people used excessive fertilisers in the fields, they were carried down to the lake by the rains. As many fertilisers contain phosphates and nitrates, the water body became enriched with these chemicals. These chemicals promote excessive growth of aquatic plants and the surface of water was completely covered with plants (eutrophication). Due to insufficient availability of dissolved oxygen and nutrients resulted in the death of fish.

30. Both the energy sources, coal and petroleum, take millions of years for their formation. As these resources are being utilised at a much faster rate than their formation, they will be exhausted in the near future, hence they need to be conserved.

Long Answer Questions

31. **Hint—** (a) Hydrogen gas will evolve with a greater speed

(b) Almost same amount of gas is evolved

(c) Hydrogen gas is not evolved

(d) If sodium hydroxide is taken, hydrogen gas will be evolved

$$Zn + 2NaOH \rightarrow \underset{\text{Sodium zincate}}{Na_2ZnO_2} + H_2$$

or

The gas G evolved at anode during electrolysis of brine is chlorine

When chlorine gas is passed through dry $Ca(OH)_2$ (Y), it produces bleaching powder Z used for disinfecting drinking water.

$$\underset{\text{Slaked lime}}{Ca(OH)_2} + Cl_2 \rightarrow \underset{\text{Bleaching powder}}{CaOCl_2} + H_2O$$

Since Y and Z are calcium salts, therefore X is also a calcium salt and is calcium carbonate.

$$CaCO_3 + 2\,HCl \rightarrow CaCl_2 + CO_2 + H_2O$$

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

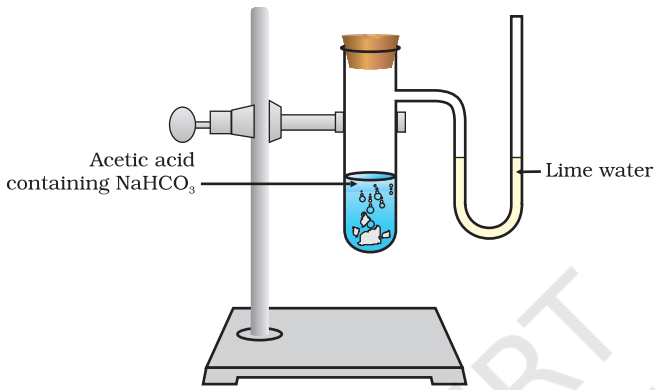
32. (a) $CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + H_2O + CO_2$

X is sodium ethanoate

Gas evolved is carbon dioxide (Y)

(b) The gas evolved during the reaction is passed through a delivery tube into the test tube containing lime water. The lime water solution turns milky due to the formation of calcium carbonate, a characteristic property of CO_2 gas.

or



(a) It will turn milky

(b) $2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + H_2O + CO_2$ (Test tube A)

$Ca(OH)_2 + CO_2 \rightarrow CaCO_3 + H_2O$ (Test tube B)

With excess CO_2, milkyness disappears.

$CaCO_3 + H_2O + CO_2 \rightarrow Ca(HCO_3)_2$

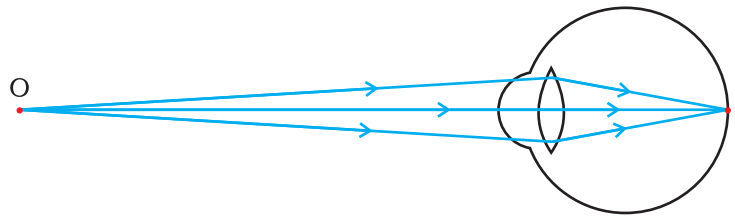
(c) As C_2H_5OH and Na_2CO_3 do not react, a similar change is not expected

$C_2H_5OH + Na_2CO_3 \rightarrow$ No change

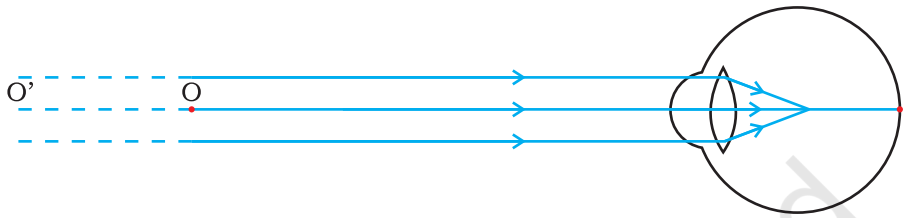
(d) The lime water is prepared by dissolving calcium oxide in water and decanting the supernatent liquid. The reaction is referred to as slaking of lime

$CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(aq) + Heat$

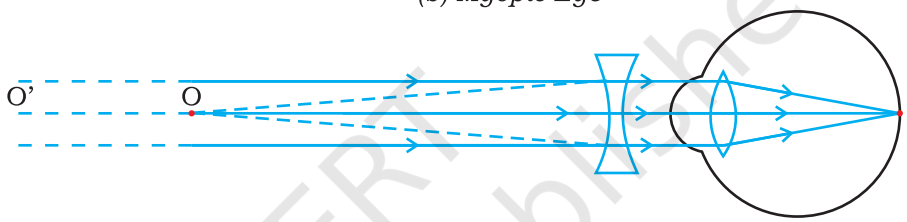
33.



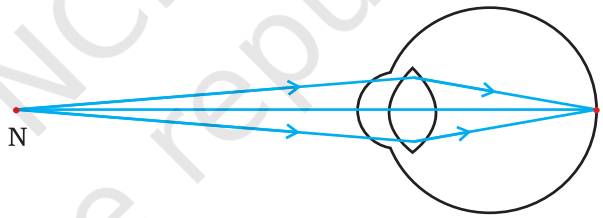
(a) Far point



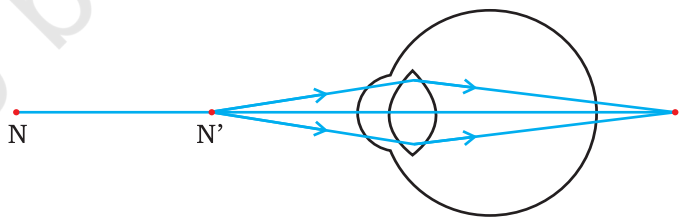
(b) Myopic Eye



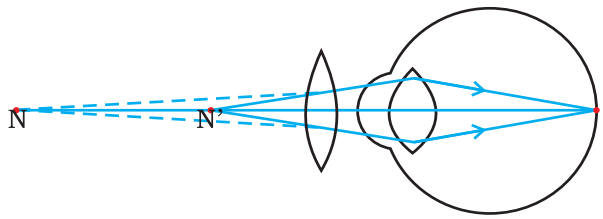
(c) Correction for myopia



(a) Near point



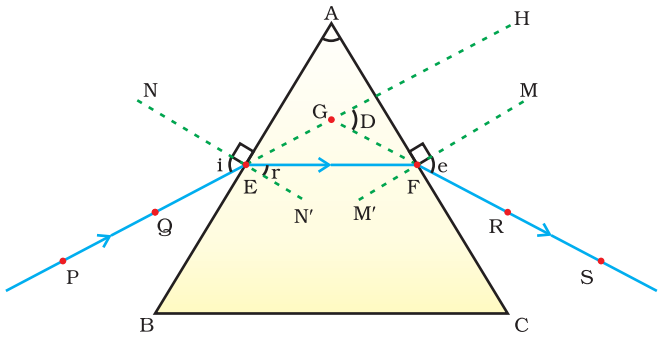
(b) Hypermetropic eye



(c) Correction for hypermetropia

Hint— When a person is not able to see distant objects clearly but can see nearby objects clearly then he/she is considered to be myopic. If it is othewise, he/she is hypermetropic. Give explanation based on figures.

or



Hint— Give explanation based on figure. Angle of deviation is the angle D, between the incident ray and the emergent ray when a light ray passes through a glass prism.

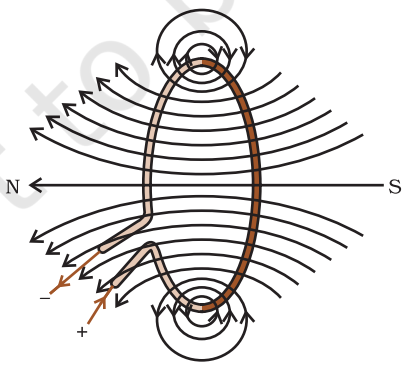
34. **Hint—** Answer must include working of a solar device using reflectors/solar cell; limitations; available during day time/sunny days. Requires huge costly installations. To overcome limitation: use of solar cell.

or

Hint— Biomass- Plant and animal wastes

Give description of biogas plant with the help of label diagram.

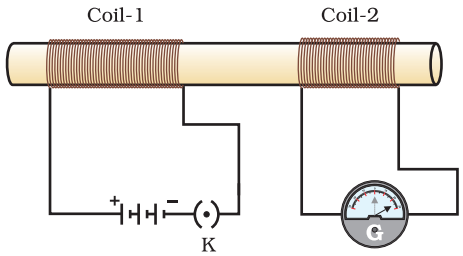
35.



Hint— The magnetic field at a point is the resultant of the field produced by each turn.

or

Hint— The process by which changing magnetic field in a conductor induces a current in another conductor is called electromagnetic induction.



Explain the working of the setup with the help of the diagram.

36. Hint— (i) Separation of biodegradable and non-biodegradable substances.

(ii) Gardening

(iii) Use of gunny bags/paper bags in place of polythene/plastic bags

(iv) Use of compost and vermicompost in place of fertilisers

(v) Harvesting rain water

or

Hint—

(a) Exessive use of fertilisers changes the chemistry of soil and kills useful microbes.

(b) Excessive use of non-biodegradable chemical pesticides leads to biological magnification.

(c) Extensive cropping causes loss of soil fertility.

(d) Excessive use of ground water for agriculture lowers the water table.

(e) Damage to natural ecosystem/habitat.