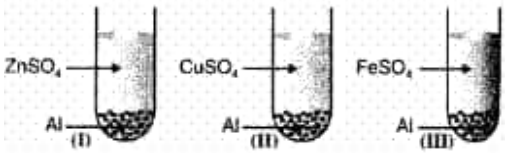
Class X Session 2023-24
Subject - Science
Sample Question Paper - 6

Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective-type questions carrying 1 mark each.
4. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
5. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
6. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

Section A

1. 

[1]

Obseravation	**I**	**II**	**III**
Solution after reaction	Colourless	Colourless	Colourless
Metal Deposited	Zn	Cu	Fe

Which of the following is correct conclusion?

a) Al is more reactive than Cu and Fe but less reactive than Zn

b) Al is more reactive than Cu but less reactive than Zn and Fe

c) Al is more reactive than Zn and Cu but less reactive than Fe

d) Al is more reactive than Zn, Cu, Fe

2. What do you observe when sodium sulphate is added to barium chloride solution? **[1]**

a) Transparent solution is formed

b) Bubbles are seen

c) Gas is released

d) A white insoluble substance is formed

3. Common salt besides being used in kitchen can also be used as raw material for making ? **[1]**

i. Washing soda

ii. Bleaching powder

iii. Baking soda

iv. Slaked lime

a) All of these

b) A and D

c) A and C

d) B and D

4. Carbon exists in the atmosphere in the form of **[1]**

a) coal

b) carbon dioxide only

c) carbon monoxide in traces and carbon dioxide

d) carbon monoxide only

5. Aluminum is used for making cooking utensils. Which of the following properties of aluminum are responsible for the same? **[1]**

i. Good thermal conductivity

ii. Good electrical conductivity

iii. Ductility

iv. High melting point

a) (i) and (ii)

b) (i) and (iii)

c) (ii) and (iii)

d) (i) and (iv)

6. What happens when ammonia reacts with hydrogen chloride? $NH_3 + HCl \rightarrow ?$ **[1]**

a) Both H_2 and NH_4Cl

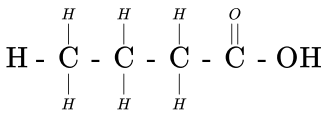
b) H_2 gas is evolved

c) NH_4Cl is formed

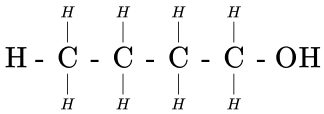
d) Cl_2 gas is evolved.

7. The correct structural formula of butanoic acid is **[1]**

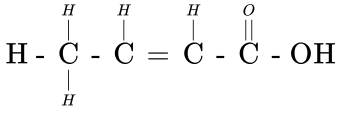
a)



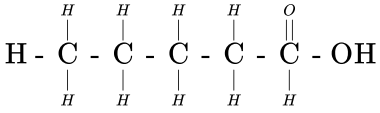
b)



c)



d)



8. A black strip of paper was clipped onto a destarched leaf in a potted plant to cover a part of the leaf. The plant was then exposed to sunlight for four hours, the paper strip was removed and the leaf was tested for starch. When iodine solution was added: **[1]**

a) The entire leaf turned blue-black.

b) The uncovered part of the leaf became blue-

black.

c) The colour of the iodine solution remain unchanged.

d) The covered part of the leaf became blue-black.

9. The chromatids are joined to each other by **[1]**

a) Centriole

b) Centromere

c) Spindle

d) Aster

10. Fertilisation is the process of **[1]**

a) transfer of male gamete to female gamete

b) adhesion of male and female reproductive organs

c) the formation of gametes by a reproductive organ

d) fusion of nuclei of male and female gamete

11. A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all tall plants because **[1]**

a) height of pea plant is not governed by gene 'T' or 't'

b) tallness is the recessive trait

c) shortness is the dominant trait

d) tallness is the dominant trait

12. Before setting up an experiment to show that seeds release carbon dioxide during respiration, the seeds should be **[1]**

a) boiled to make them soft

b) kept moist till they germinate

c) soaked in vinegar

d) dried completely

13. The most important safety device method used for protecting electrical appliances from short circuiting or overloading is **[1]**

a) fuse

b) earthing

c) use of stabilizer

d) use of electric meter

14. An electric fuse works on the: **[1]**

a) chemical effect of current

b) lighting effect of current

c) heating effect of current

d) magnetic effect of current

15. Which one of the following is an artificial ecosystem? **[1]**

a) Crop field

b) Forest

c) Lake

d) Pond

16. What will happen if deer is missing in the given food chain? **[1]**

Grass $\rightarrow$ Deer $\rightarrow$ Tiger

a) The population of tiger will decrease and the growth of grass will increase.

b) The growth of grass will decrease.

c) The population of tiger will increase.

d) Tiger will start eating grass.

17. **Assertion (A):** Colour of copper sulphate solution changes when an iron nail is kept immersed in it. **[1]**

Reason (R): The colour of copper sulphate solution changes when iron nail is kept immersed in it due to the

decomposition reaction taking place between iron and copper leading to formation of iron sulphate.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

18. **Assertion (A) :** XX chromosome give rise to female child whereas XY give rise to male child. **[1]**
Reason (R) : The Y chromosome in males is small than X chromosome.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

19. **Assertion (A):** A neutral body may experience a net nonzero magnetic force. **[1]**
Reason (R): The net charge on a current-carrying wire is zero, but it can experience a force in a magnetic field.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

20. **Assertion (A):** Green plants of the ecosystem are the transducers. **[1]**
Reason (R): Producers trap the radiant energy of the sun and the change it into chemical energy.

a) Both A and R are true and R is the correct explanation of A.
b) Both A and R are true but R is not the correct explanation of A.
c) A is true but R is false.
d) A is false but R is true.

Section B

21. Consider the following molecular formulae of carbon compounds: **[2]**
(i) CH_3COOH (ii) CH_3OH (iii) C_2H_6 (iv) C_3H_4 (v) C_4H_8

a. Which one of these compounds belongs to homologous series of alcohols?
b. Identify the compound having triple bond between carbon - carbon atoms.
c. Write the molecular formula of the first member of the homologous series to which CH_3COOH belongs.
d. Write the general formula of the series to which the compound C_4H_8 belongs.

22. Give two examples of each. Vegetative propagation by **[2]**
(i) Tissue culture
(ii) Layering

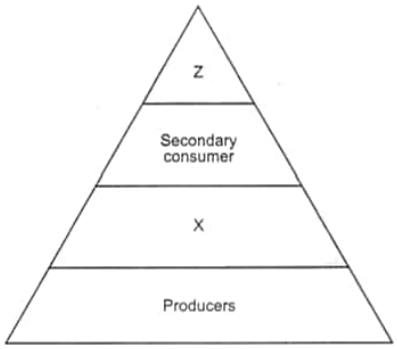
23. What are the major constituents of urine? **[2]**

OR

Write characteristics of enzymes.

24. a. Draw a ray diagram to show the formation of image by a concave lens when an object is placed in front of it. **[2]**
b. In the same diagram mark the object-distance (u) and the image-distance (v) with their proper signs (+ve or -ve as per the new Cartesian sign convention) and state how these distances are related to the focal length (f) of the concave lens in this case.
c. Find the nature and power of a lens which forms a real and inverted image of magnification - 1 at a distance of 40 cm from its optical centre.*

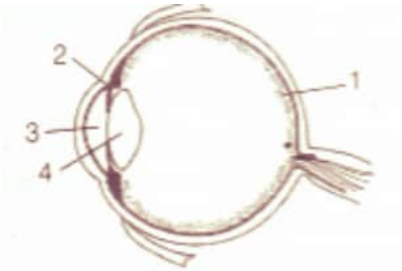
25. Write the appropriate names of the trophic levels Z and X in the figure given below: **[2]**



OR

In an ecosystem, how the biotic and abiotic components are dependent on each other?

26. Name the four parts labelled as 1, 2, 3 and 4 in the given figure. **[2]**



Section C

27. i. Which types of metals can be obtained in their pure form by just heating their oxides in air? Give one example. **[3]**

ii. Consider the reaction given below used to obtain Manganese metal in pure form:

$3MnO_2(s) + 4Al(s) \longrightarrow 3Mn(l) + 2Al_2O_3(s) + Heat$

a. What type of reaction is it?

b. What is the role of aluminium in this reaction?

28. An ore on treatment with dilute hydrochloric acid gives a smell like that of rotten eggs. What type of ore is this? How can it be concentrated? How can the metal be obtained from the concentrated ore? **[3]**

OR

Give reasons:

a. Platinum, gold and silver are used to make jewellery.

b. Sodium, potassium and lithium are stored under oil.

c. Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.

d. Carbonate and sulphide ores are usually converted into oxides during the process of extraction.

e. Lemon or tamarind juice are effective in cleaning tarnished copper vessels.

29. Explain how deoxygenated blood travels from body to lung for purification. Draw well-labelled diagram in support of your answer. **[3]**

30. A child questioned his teacher that why do organisms resemble their parents more as compared to grandparents. In which way will the teacher explain to the child? **[3]**

31. One-half of a convex lens is covered with a black paper. Will this lens produce a complete image of the object? Verify your answer experimentally. Explain your observations. **[3]**

32. Two resistors of resistances R and 2R are connected in series is an electrical circuit? Calculate the ratio of the electric power consumed by R and 2R? **[3]**

33. Compare the power used in 2Ω resistor in each of the following circuits **[3]**

i. a 6V battery in series with 1Ω and 2Ω resistors and

ii. a 4V battery in parallel with 12Ω and 2Ω resistors.

Section D

34. A salt X is formed and a gas is evolved when ethanoic acid reacts with sodium hydrogencarbonate. Name the salt X and the gas evolved. Describe an activity and draw the diagram of the apparatus to prove that the evolved gas is the one which you have named. Also, write chemical equation of the reaction involved. **[5]**

OR

Identify the compounds A to E in the following reaction sequence.

i. $CH_3CH_2OH \xrightarrow{KMnO_4+KOH} A$

ii. $CH_3CH_2OH + A \xrightarrow[\triangle]{Conc.\ H_2SO_4} B$

iii. $B + NaOH \rightarrow C + CH_3CH_2OH$

iv. $A + NaHCO_3 \rightarrow C + D + H_2O$

v. $CH_3CH_2OH + E \rightarrow CH_3CH_2ONa + H_2$

35. Briefly describe double fertilisation in plants. **[5]**

OR

Draw a labeled diagram of neuron and explain its function.

36. a. List four characteristics of the images formed by plane mirrors. **[5]**

b. A 5 cm tall object is placed at a distance of 20 cm from a concave mirror of focal length 30 cm. Use mirror formula to determine the position and size of the image formed.

OR

A student wants to project the image of a candle flame on the walls of the school laboratory by using a mirror.

i. Which type of mirror should he use and why?

ii. At what distance, in terms of focal length f of the mirror, should he place the candle flame to get the magnified image on the wall?

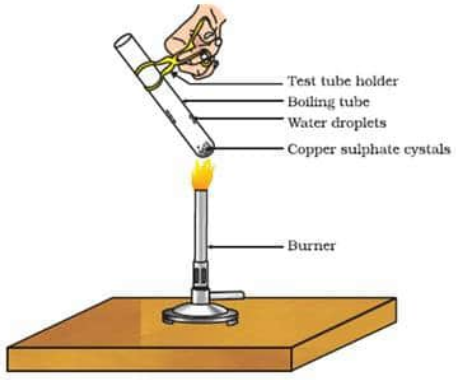
iii. Draw a ray diagram to show the formation of the image in this case.

iv. Can he use this mirror to project a diminished image of the candle flame on the same wall State 'how' , if your answer is 'yes' and why not', if your answer is 'no'.

Section E

37. **Read the text carefully and answer the questions:** **[4]**

Copper sulphate crystal contains water of crystallisation when the crystal is heated the water is removed and salt turns white. The crystal can be moistened again with water. The water of crystallisation is the fixed number of water molecules present in 1 formula unit of copper sulphate. On heating gypsum at 373K, it loses water molecules and became calcium sulphate hemihydrate.



(i) If the crystal is moistened with water, then which colour of the crystal reappears?

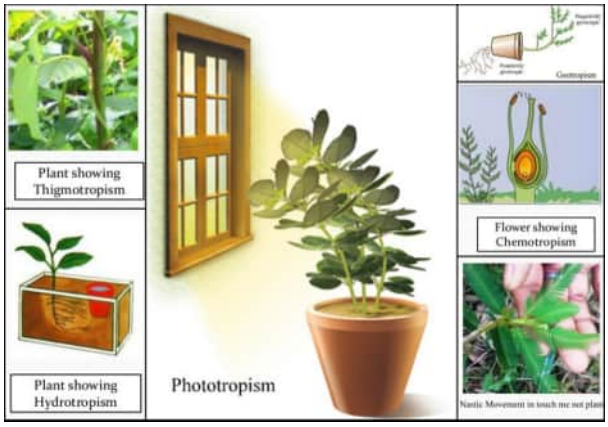
(ii) What is the commercial name of calcium sulphate hemihydrate?

OR

How many water molecules are present in one formula unit of copper sulphate?

38. **Read the text carefully and answer the questions:** **[4]**

Animals have a nervous system for controlling and coordinating the activities of the body. But plants have neither a nervous system nor muscles. So, how do they respond to stimuli? When we touch the leaves of a chhui-mui (the 'sensitive' or 'touch-me-not' plant of the Mimosa family), they begin to fold up and droop. When a seed germinates, the root goes down, the stem comes up into the air. What happens? Firstly, the leaves of the sensitive plant move very quickly in response to touch. There is no growth involved in this movement. On the other hand, the directional movement of a seedling is caused by growth. If it is prevented from growing, it will not show any movement. So plants show two different types of movement - one dependent on growth and the other independent of growth.



(i) Plants neither have nervous system nor muscles, then how does chemical coordination occur in plants?

(ii) Why *Mimossa pudica* leaves drop down when we touched? Write its another name also.

(iii) What is turgor movement?

OR

What is a tropic movement? Explain with an example

39. **Read the text carefully and answer the questions:** **[4]**

A student fixes a sheet of white paper on a drawing board using some adhesive materials. She places a bar magnet in the centre of it and sprinkles some iron filings uniformly around the bar magnet using a salt sprinkler. On tapping the board gently , she observes that the iron filings have arranged themselves in a particular pattern.

(i) What makes iron filings arrange in a definite pattern?

(ii) Draw a diagram to show this pattern of iron filings.

(iii) How is the direction of magnetic field at a point determined using the field lines? Why do two magnetic field lines not cross each other?

OR

How are the magnetic field lines of a bar magnet drawn using a small compass needle? Draw one magnetic field line each on both sides of the magnet.

Solution

Section A

1. **(d)** Al is more reactive than Zn, Cu, Fe

   Explanation: $2Al + 3ZnSO_4 \rightarrow Al_2(SO_4)_3 + 3\ Zn$

   $2Al + 3CuSO_4 \rightarrow Al_2(SO_4)_3 + 3\ Cu$

   $2Al + 3FeSO_4 \rightarrow Al_2(SO_4)_3 + 3Fe$

   Al is more reactive than Zn, Cu and Fe because it displaces them from their salt solution.

2. **(d)** A white insoluble substance is formed

   Explanation: When barium chloride combines with sodium sulphate in the form of their aqueous solutions, a white precipitate of barium sulphate is formed which is insoluble in water. The reaction also creates sodium chloride, which remains dissolved in water and so cannot be seen.

   $BaCl_2(aq) + Na_2SO_4(aq) \rightarrow BaSO_4(s)_{(White\ precipitate)} + 2NaCl(aq)$

   It is known as the precipitation reaction.

3. **(c)** A and C

   Explanation: Baking soda ($NaHCO_3$) is produced by reacting a cold and concentrated solution of sodium chloride(NaCl) with ammonia and carbon dioxide.

   $NaCl + NH_3 + H_2O + CO_2 \rightarrow NaHCO_3 + NH_4Cl$ -(1)

   Washing soda ($Na_2CO_3.10H_2O$) is produced by further heating the $NaHCO_3$ obtained in first reaction.

   $2NaHCO_3 \rightarrow Na_2CO_3 + CO_2 + H_2O$

   The anhydrous Na_2CO_3 thus obtained is dissolved in water to obtain washing soda.

4. **(b)** carbon dioxide only

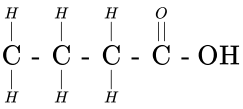
   Explanation: Carbon exists in the atmosphere in the form of carbon dioxide gas (CO_2) in the air (only 0.03%). Carbon also occurs in the earth's crust in the form of minerals likes carbonates. It also occurs in the form of fossil fuels, organic compounds, wood, cotton, and wool, etc.

5. **(d)** (i) and (iv)

   Explanation: Aluminium has good thermal conductivity and high melting point. These properties are useful in the making of utensils. The commonly used metals in making utensils are copper, steel (an alloy of iron) and aluminium.
   Copper and aluminium are the most preferred due to their conduction of heat.

6. **(c)** NH_4Cl is formed

   Explanation: Ammonium chloride is formed when ammonia reacts with hydrogen chloride. It is a combination reaction.
   $NH_3(g) + HCl(g) \rightarrow NH_4Cl(s)$

7. **(a)** 

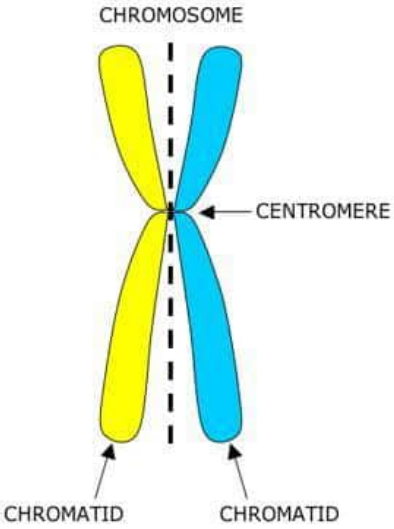
   Explanation: The general formula of a carboxylic acid is R-COOH where R is an alkyl group. So, because 'butane' shows the presence of 4 single-bonded carbon atoms 'oic acid' shows the presence of $-\overset{O}{\overset{\|}{C}}- OH$ group. The formula of butanoic acid is C_3H_7COOH.

8.

(b) The uncovered part of the leaf became blue-black.
Explanation: The uncovered part of the leaf became blue-black.

9.

(b) Centromere
Explanation: A sister chromatid refers to either of the two identical copies (chromatids) formed by the replication of a single chromosome, with both copies joined together by a common centromere. In other words, a sister chromatid may also be said to be 'one-half' of the duplicated chromosome. A full set of sister chromatids is created during the synthesis (S) phase of interphase, when all the chromosomes in a cell are replicated. The two sister chromatids are separated from each other into two different cells during mitosis or during the second division of meiosis.



10.

(d) fusion of nuclei of male and female gamete
Explanation: fusion of nuclei of male and female gamete

11.

(d) tallness is the dominant trait
Explanation: According to the law of dominance, the character that is expressed in the F_1 generation is called the dominant trait whereas character that is not expressed in F_1 generation is knowns as recessive trait. Thus, tallness is the dominant trait.

12.

(b) kept moist till they germinate
Explanation: Before setting up an experiment to show that seeds release carbon dioxide during respiration, the seeds should be kept moist till they germinate as germinating seeds produced CO_2 gas.

13. **(a)** fuse
Explanation: The most important safety, method used for protecting home appliances from short circuiting or overloading is the electric fuse. This is a safety device having thin wire of short length made of tin (25%) and lead (75%) alloy having low melting point around 200°*C*. The fuse wire is of chosen thickness, so as to fix its resistance and hence amount of heating on passage of a particular amount of current. Whenever current through the fuse exceeds the set limit, the fuse wire melts and breaks the circuit. This saves the main circuit components from damage.

14.

(c) heating effect of current
Explanation: The heating effect of current is the working principle for an electric fuse.

15. **(a)** Crop field
Explanation: The crop field is a man-made ecosystem.

16. **(a)** The population of tiger will decrease and the growth of grass will increase.
Explanation: If deer is missing from the given food chain, the population of tiger will decrease and the growth of grass will increase.

17.

(c) A is true but R is false.

Explanation: The colour of copper sulphate solution changes when iron nail is kept immersed in it due to the displacement reaction taking place between iron and copper leading to formation of iron sulphate. Thus assertion is true, but reason is false.

18.

(b) Both A and R are true but R is not the correct explanation of A.

Explanation: Smaller Y chromosome, does not decide the gender of the child. Its presence is important not the size. Thus both assertion and reason are true, but reason is not the correct explanation of the assertion.

19. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation: Both A and R are true and R is the correct explanation of A.

20. **(a)** Both A and R are true and R is the correct explanation of A.

Explanation: Both A and R are true and R is the correct explanation of A.

Section B

21. a. Methanol (CH_3OH) belongs to homologous series of alcohols.

b. C_3H_4 has triple bond between carbon atoms.

c. Methanoic acid (HCOOH)

d. General formula of C_4H_8 is C_nH_{2n}.

22. i) Tissue culture - Orchid, Asparagus

ii) Layering - Magnolia, Rhododendron.

23. The urine is made up of a number of constituents. It is an aqueous solution mainly composed of water (95%). It also consists of some organic and inorganic compounds. Other constituents include small amounts of urea, creatinine and some dissolved ions such as sodium, potassium and chloride.

OR

Characteristics of enzymes

1) Enzymes are proteins synthesized in the cell.

2) Enzymes can speed up the reactions but cannot initiate them.

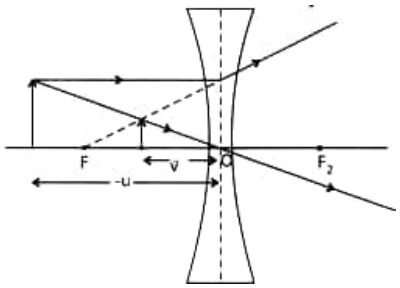
3) Enzymes remain uncharged during reaction, hence are needed in very small amount.

4) Enzymes are reaction specific i.e one enzyme catalyzes only one specific reaction.

5) Enzymes are pH sensitive.

6) Enzymes are heat labile. They have some optimum temperature (35-40^oC) above which these are denatured.

24. a.



b. The object distance (u) and image distance (v) are marked in the diagram of part (a).

Relation: $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

c. As, m = - 1; hence, the lens is convex.

Now, Magnification, m = $\frac{v}{u}$ = -1

$\therefore$ v = -u

Thus object is at 2f.

2f = 40cm

f = 20cm = 0.2m.

P = $\frac{1}{f} = \frac{1}{0.2}$ = + 5D(convex lens).

25. X - Primary consumers; Z - Tertiary consumers

OR

All living organisms not only interact with each other but also with their environment. Their growth, reproduction and other activities are affected by temperature, water, humidity, etc., which constitutes abiotic components. Even their body structure and needs depend upon the surroundings. Hence, biotic and abiotic components are dependent on each other.

26. i. Retina, it is a sensory membrane where image is formed.

ii. Ciliary muscles, it changes the focal length of the lens.

iii. Pupil. aperture through which light enters.

iv. Eye lens, focus light onto the retina.

Section C

27. i. Metals low in activity series can be reduced to pure metals just by heating their oxides in presence of air, example mercury (Hg):

$$\underset{\text{Mercurous oxide}}{2\text{HgO(s)}} \xrightarrow{\text{Heat}} \underset{\text{Mercury}}{2\text{Hg(l)}} + \text{O}_2\text{(g)}$$

ii. a. The given reaction is a displacement reaction.

b. Aluminium is more reactive than manganese used as a reducing agent, as Al is capable of replacing Mn from MnO_2.

28. The gas which smells like that of rotten eggs is H_2S. Hence, the ore is a sulphide ore. It is concentrated by froth-floatation process. The metal is obtained from the concentrated ore in the following two steps:

i. Roasting: Heating the ore strongly in the presence of air. The metal sulphide is converted into metal oxide along with evolution of sulphur dioxide gas.

Metal sulphate + $O_2 \xrightarrow{Roasting}$ Metal oxide + SO_2

ii. Reduction with carbon: On heating the metal oxide with carbon, it is reduced to free metal.

Metal oxide + Carbon $\xrightarrow{Reduction}$ Metal + Carbon monoxide

OR

a. Platinum, gold and silver are used to make jewelry because of their bright shiny surface and high resistance to corrosion. Also they have high malleability and ductility.

b. Sodium, potassium and lithium are stored under oil to prevent their reaction with oxygen, moisture and carbon dioxide of air so as to protect them.

c. Aluminum metal forms a thin layer of aluminum oxide all over its surface under the action of moist air. This layer prevents the metal underneath from further corrosion. It is cheap, easily available, malleable and ductile. Therefore, it is used to make utensils for cooking.

d. It is easier to obtain a metal from its oxides as compared to its sulphides and carbonates. So, prior to reduction, metal carbonate and sulphides must be converted into metal oxides. A carbonate ore is converted into oxide by calcination whereas a sulphide ore is converted into oxide by roasting.

e. When copper vessels are exposed to moist air, they form a green coating of basic copper carbonate [$CuCO_3.Cu(OH)_2$].

$$\underset{From\ \ Moistair}{2Cu + CO_2 + O_2 + H_2O} \rightarrow \underset{Basic\ \ Copper\ \ Carbonate\ (Green)}{CuCO_3.Cu(OH)_2}$$

The sour substances such as lemon or tamarind juice contain acids. Lemon juice contains citric acid and tamarind contains tartaric acid. These acids dissolve the coating of copper oxide or basic copper carbonate present on the surface of tarnished copper vessels and make them shining red-brown again.

29. The deoxygenated blood is collected from the body tissues through the veins which further combine to form vena cava. This vena cava pours deoxygenated blood collected from the body tissues into the right auricle of the heart. From the right auricle, it goes to the right ventricle and from here the blood is pumped into the pulmonary artery which takes the deoxygenated blood from the heart to the lungs. In the alveoli of the lungs, the blood is oxygenated. This oxygenated blood is pumped into the pulmonary veins which pour the blood into the left auricle. From here the oxygenated blood is poured into the left ventricle. The left ventricle pushes the blood into the aorta which pumps the oxygenated blood into the body tissues and supplies oxygen through the tissues for various body functions.

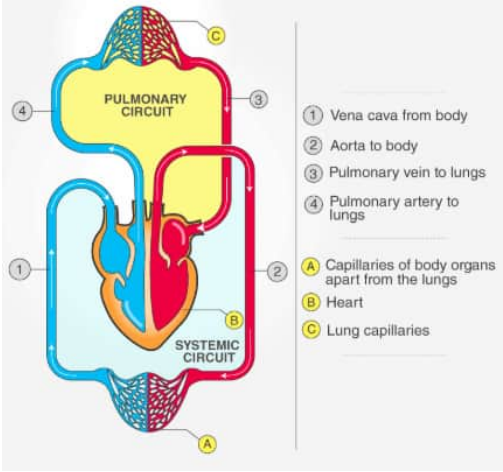
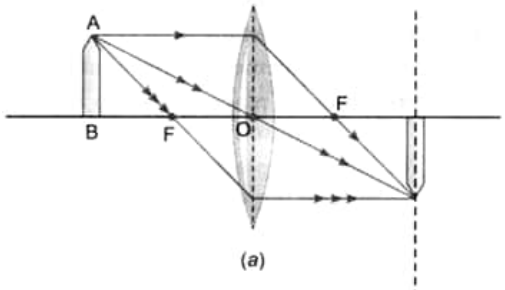


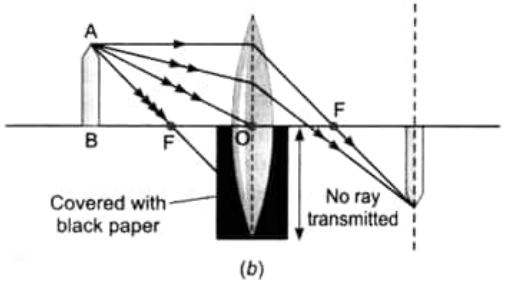
Figure: The double circulation of blood

30. The two parents involved in sexual reproduction produce gametes which fuse together forming a zygote. It gradually develops into a young child showing certain similarities with the parents.
Since, a child inherits its characters from both the parents the resemblance with them is very close. The grandparents and the child resemble less closely because a gap of gene pool is created by the parents of the child. Since the child is immediate generation next to his parent thus to carry more similar genes as that of parents. Variations are more with grandparents.

31.



(a)



(b)

Yes, even when one-half of a convex lens is covered with a black paper, the lens will produce a complete image.
Take a live candle, keep it in front of a convex lens mounted on an optical bench.
Move the candle along the axis of bench and take its full image on a screen. Now cover the lower half of lens with a black paper without changing the positions of candle, lens and screen.
You will observe that full image of candle is still seen on the screen, but the intensity of image is reduced. The reason is that a large number of rays incident on the lens are blocked. In the case of covered lower half of lens with black paper, the rays that are emerging from candle and incident on lens are refracted from upper part only and form the full image.

32. Electric power consumed by

R is $(P_1) = I^2R$

2R is $(P_2) = I^2 2R$

$\frac{P_1}{P_2} = \frac{I^2 R}{I^2 2R}$

$P_1 : P_2 = 1:2$

33. i. $1 + 2 = 3\Omega$ when connected in series

current through each resistor $I = \frac{V}{R_S} = \frac{6}{3} = 2A$

Power used in 2Ω resistor $P_1 = I^2R = (2)^2 (2) = 8\Omega$

$P_1 = 8\Omega = \frac{V}{2} = \frac{4}{2} = 2A$

ii. Current through 2Ω resistor

Power across 2Ω = $I^2R = (2)^2$ (2)

P_2 = 8Ω

$\frac{P_1}{P_2} = \frac{8}{8} = \frac{1}{1}$

Section D

34. Salt 'X' is sodium ethanoate (CH_3COONa) and the evolved gas is carbon dioxide (CO_2).

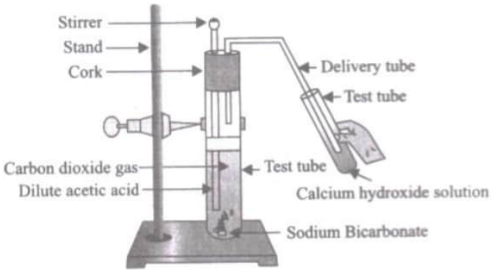
i. Take a test tube and a bent tube.

ii. Take ethanoic acid and sodium bicarbonate solution in the test tube.

iii. Insert the bent tube in the cork and fit the cork at the mouth of the test tube.

iv. Fill lime water in the bent tube so that lime water is in the 'U' portion of this tube.

After some time; it is observed that the lime water turns milky. This confirms that the evolved gas is carbon dioxide. The diagram is given below:



You will observe that the lime water turns milky. This shows that the evolved gas is carbon dioxide. The following reaction takes place between ethanoic acid and sodium hydrogen carbonate.

$CH_3COOH + NaHCO_3 \longrightarrow CH_3COONa + CO_2 + H_2O$

OR

i. A : CH_3COOH (Acetic acid) . It is obtained by oxidation of ethanol.

ii. B : $CH_3 - \overset{O}{\overset{||}{C}} - OC_2H_5$ (Ethyl ethanoate) . the reaction is esterification reaction.

iii. C : CH_3COONa (Sodium ethanoate). The reaction is saponification reaction.

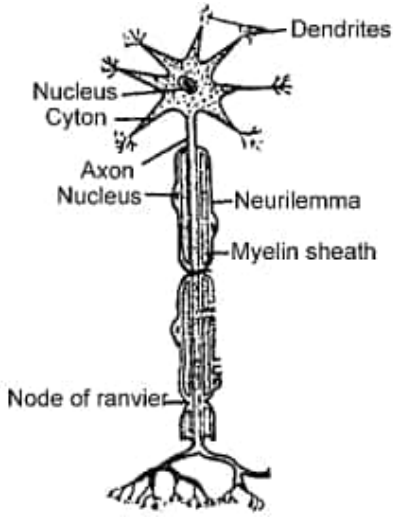
iv. D : CO_2 (Carbon dioxide) .

v. E : Na (Sodium)

35. Soon after pollination the pollen grains start germinating and form a pollen tube. The pollen tube grows within the style till it reaches the ovary.

On reaching the ovary it enters the ovule through an opening called micropyle. In the meantime, two male gametes are formed in the pollen tube. One of the male gametes fuses with the egg, the process is called syngamy. The product formed is termed as zygote. The other male gamete fuses with the two polar nuclei, one from each end of embryo sac, to form endosperm nucleus. This process is called triple fusion. In this process three nuclei, two polar nuclei and one male gamete is involved, so it is called triple fusion. Thus, inside each embryo sac two fusions, i.e., syngamy and triple fusion take place. This mechanism of two fusions occurring in an embryonal sac is called double fertilisation. After fertilisation, the ovule develops into seed and the ovary develops into a fruit.

OR



Functions :

i. Nerve cells are specialized for conducting information via electrical impulses from one part of the body to another part.
ii. Dendrites acquire the information.
iii. Axon conducts information as electrical impulse.
iv. Terminal arborization pass the information as chemical stimulus at synapse for onward transmission.

36. a. The four Characteristics of image formed by plane mirror:-
(i) The image is same size as the object.
(ii) The image is erect and virtual.
(iii) The image is laterally inverted.
(iv) The distance between the object and mirror is same as the distance between image and mirror.

b. Given: height of object h = 5 cm, distance of object u = - 20 cm, focal length of mirror f = - 30 cm

$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ (By using mirror formula)

$\frac{1}{v} = \frac{1}{-30} - \frac{1}{-20}$

v = 60 cm

The image is formed at 60 cm on the backside of the mirror.

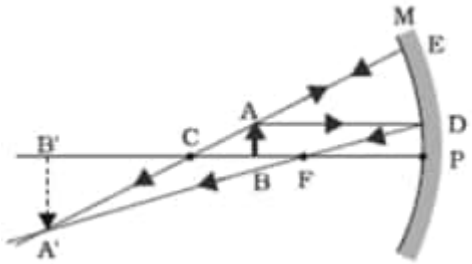
Now, magnification $m = \frac{h'}{h} = -\frac{v}{u}$

h' = 15 cm

The size of the image is 15 cm

OR

i. The student should use a Concave mirror because a concave mirror produces real images.
ii. To get magnified image, the student should put the candle flame between f and 2f.
iii. The ray diagram will be as follows:



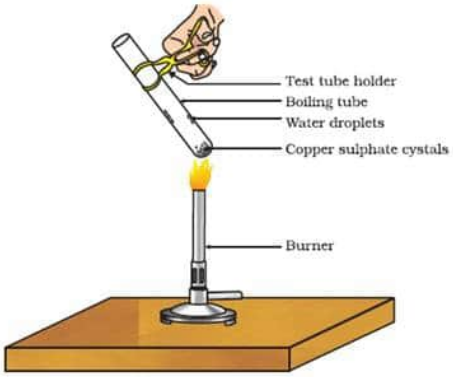
iv. Yes, concave mirror can be used to obtain a diminished image. When the object is placed beyond 2f, then the image formed will be diminished one.

Section E

37. **Read the text carefully and answer the questions:**

Copper sulphate crystal contains water of crystallisation when the crystal is heated the water is removed and salt turns white. The crystal can be moistened again with water. The water of crystallisation is the fixed number of water molecules present in 1

formula unit of copper sulphate. On heating gypsum at 373K, it loses water molecules and became calcium sulphate hemihydrate.



(i) If the crystal is moistened with water, then the blue colour of the crystal reappears.

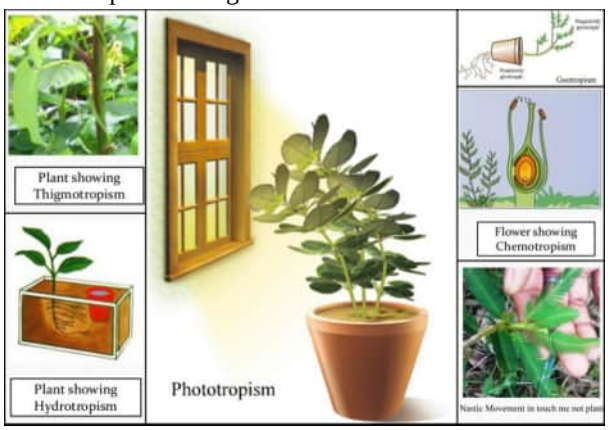
(ii) The commercial name of calcium sulphate hemihydrate is Plaster of Paris.

OR

Five water molecules are present in one formula unit of copper sulphate.

38. **Read the text carefully and answer the questions:**

Animals have a nervous system for controlling and coordinating the activities of the body. But plants have neither a nervous system nor muscles. So, how do they respond to stimuli? When we touch the leaves of a chhui-mui (the 'sensitive' or 'touch-me-not' plant of the Mimosa family), they begin to fold up and droop. When a seed germinates, the root goes down, the stem comes up into the air. What happens? Firstly, the leaves of the sensitive plant move very quickly in response to touch. There is no growth involved in this movement. On the other hand, the directional movement of a seedling is caused by growth. If it is prevented from growing, it will not show any movement. So plants show two different types of movement - one dependent on growth and the other independent of growth.



(i) In plants, **chemical coordination** occurs with the help of plant hormones (Phytohormones).

(ii) *Mimossa pudica's* leaves drop down when we touch it. It is due to the turgor pressure difference between the upper and lower halves of the base of the petiole. Its other name is "touch-me-not" or "chui-mui".

(iii) Turgor movement is the movement due to the difference in turgidity of the cells in the lower half and the upper half of pulvinus (petiole of a leaf).

OR

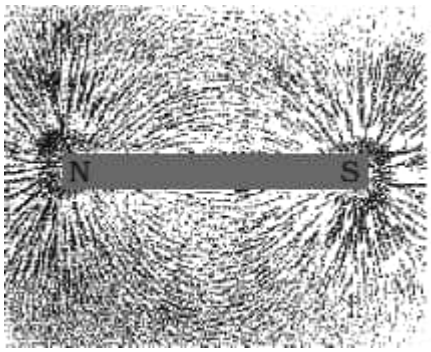
The movements which are in a particular direction in relation to the stimulus are called tropic movements. Tropic movements happen as a result of the growth of a plant part in a particular direction. For example; the shoot usually grows in the direction of sunlight. This is called positive phototropic movement.

39. **Read the text carefully and answer the questions:**

A student fixes a sheet of white paper on a drawing board using some adhesive materials. She places a bar magnet in the centre of it and sprinkles some iron filings uniformly around the bar magnet using a salt sprinkler. On tapping the board gently , she observes that the iron filings have arranged themselves in a particular pattern.

(i) The bar magnet kept at the centre of board has its magnetic field around it. The iron filings sprinkled on the board experience a force on them due to the magnetic field of bar magnet. So, when the student taps the board the iron filings align themselves according to the magnetic field lines of the bar magnet.

(ii)



(iii)The direction of a magnetic field at a point is determined by placing a small compass needle. The N - pole of compass indicates the direction of magnetic field at that point.

Two magnetic field lines do not intersect each other because if there was point of intersection, The compass needle would point towards 2 directions.

OR