

## Class X 2023-24

### Science (086)

Time: 3 Hours

Max. Marks: 80

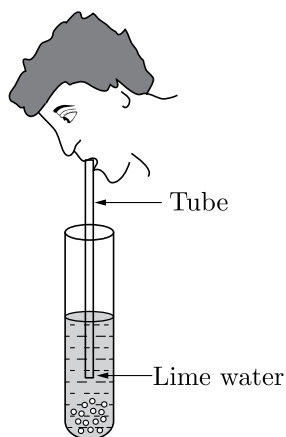
**General Instructions:**

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. Answer 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.
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## SECTION-A

Select and write one most appropriate option out of the four options given for each of the questions 1 – 20.

1. Observe the diagram of an activity given below. What does it help to conclude, when the person exhales into the test-tube?

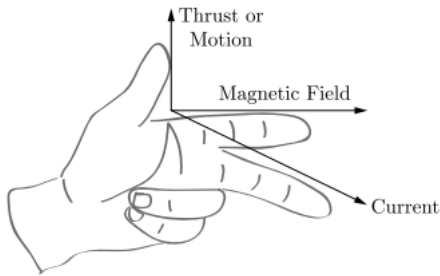


- (a) Fermentation occurs in the presence of oxygen
- (b) Percentage of carbon dioxide is more in inhaled air.
- (c) Fermentation occurs in the presence of carbon dioxide.
- (d) Percentage of carbon dioxide is more in the exhaled air.

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2. Galvanisation is a method of protecting iron from rusting by coating with a thin layer of:
- (a) aluminium
  - (b) gallium
  - (c) silver
  - (d) zinc

3.

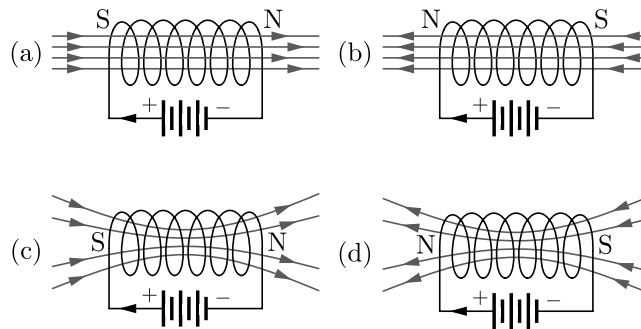


This image shows Fleming's left hand rule

Which option explains the rule to understand the working of motor?

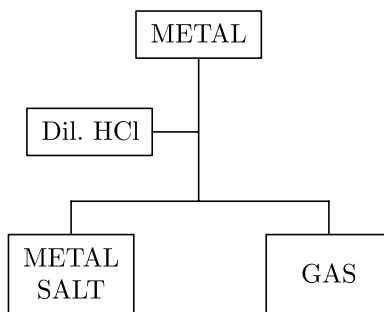
- a. When a conductor moved inside a magnetic field, current is produced in the conductor
- b. When current carrying conductor is moved with a force, it creates magnetic force
- c. When a current carrying conductor is placed in a magnetic field, it experiences a force by magnetic field
- d. When magnetic field is moved relative to conductor, current is produced in the conductor

4. The magnetic field lines of solenoid are similar to the magnetic field lines of bar magnet. Which image correctly shows the solenoid as a bar magnet?



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5.



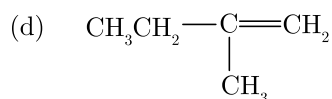
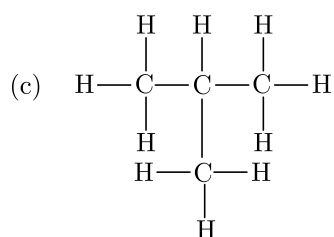
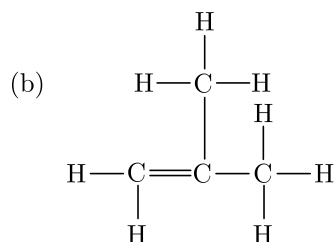
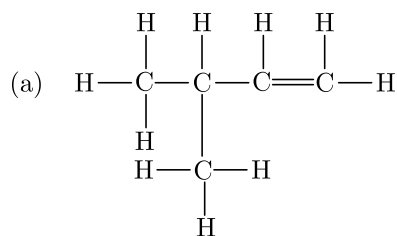
Which of the following two combinations are correct?

	Metal	Gas Evolved
(i)	Copper	Yes
(ii)	Iron	Yes
(iii)	Magnesium	No
(iv)	Zinc	Yes

- (a) i and iii  
 (b) i and iv  
 (c) ii and iii  
 (d) ii and iv
6. Equal volumes of hydrochloric acid and sodium hydroxide solutions of same concentration are mixed and the pH of the resulting solution is checked with a pH paper. What would be the colour obtained?  
 (a) Red  
 (b) Blue  
 (c) Orange  
 (d) Yellowish green
7. The direction of magnetic field around a straight conductor carrying current can be determined by:  
 (a) Fleming's right hand rule  
 (b) Right hand thumb rule  
 (c) Lenz's law  
 (d) Fleming's left hand rule
8. Ankit observed that the stain of curry on a white shirt becomes reddish-brown when soap is scrubbed on it, but it turns yellow again when the shirt is washed with plenty of water. What might be the reason for his observation?  
 (i) Soap is acidic in nature.  
 (ii) Soap is basic in nature.  
 (iii) Turmeric is a natural indicator which gives reddish tinge in bases.  
 (iv) Turmeric is a natural indicator which gives reddish tinge in acids.  
 (a) (ii) and (iii)  
 (b) (i) and (ii)  
 (c) (ii) and (iv)  
 (d) (i) and (iv)

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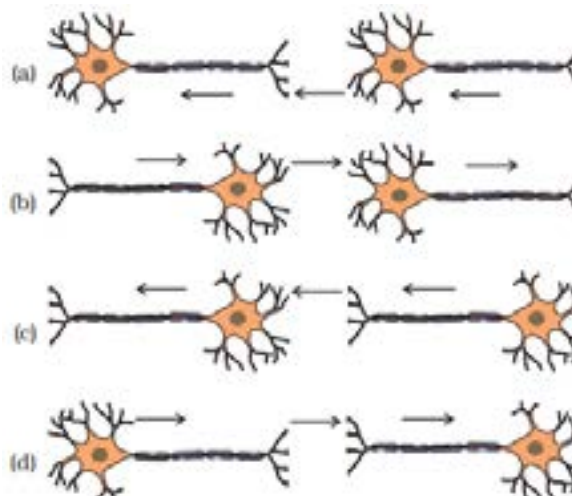
9. Which of the following hydrocarbons represent the isomer of Butene?



10. Which option correctly lists the changes that occur in females during puberty?

- reproductive organs enlarge, size of the breasts increases, thick hairs grow on the body
- thick hairs grow on face, cracking of voice, enlargement of reproductive organ
- size of the breasts increases, beginning of menstruation, thick hairs grow on the body
- thin hairs growth occurs on the body, size of the breasts increases, pitch of the voice increases

11. What is the correct direction of flow of electrical impulses?



12. Two bulbs have the following ratings :

1. 40 W, 220 V.

2. 20 W, 100 V.

The ratio of their resistance is :

(a) 2 : 1

(b) 1 : 2

(c) 1 : 3

(d) 1 : 1

13. Which of the following statements are correct in reference to the role of A (shown in the given diagram) during a breathing cycle in human beings?



(i) It helps to decrease the residual volume of air in lungs.

(ii) It flattens as we inhale.

(iii) It gets raised as we inhale.

(iv) It helps the chest cavity to become larger.

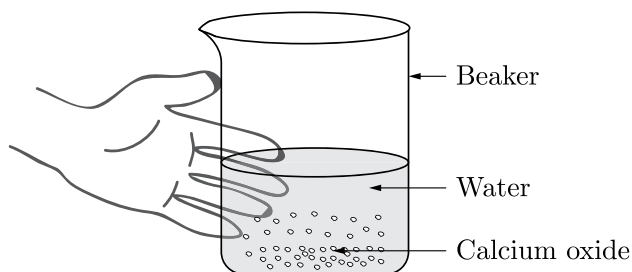
(a) (iii) and (iv)

(b) (ii) and (iv)

(c) (i), (ii) and (iv)

(d) (i) and (ii)

14. Following observations are observed when calcium oxide reacts vigorously with water.

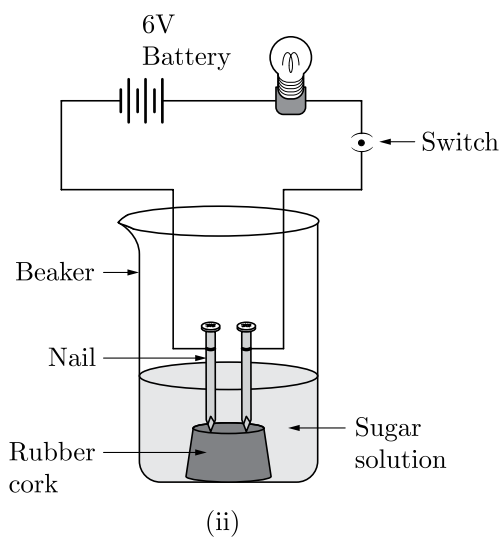
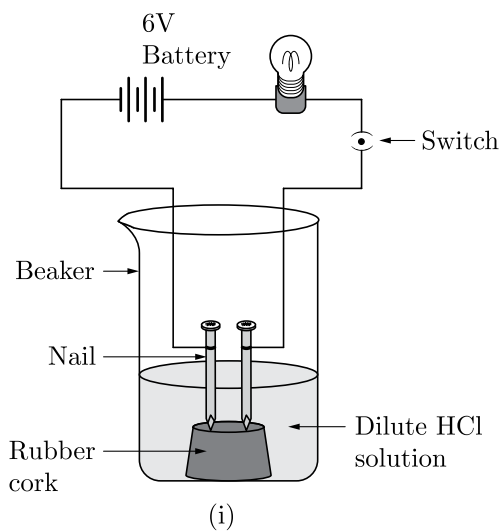


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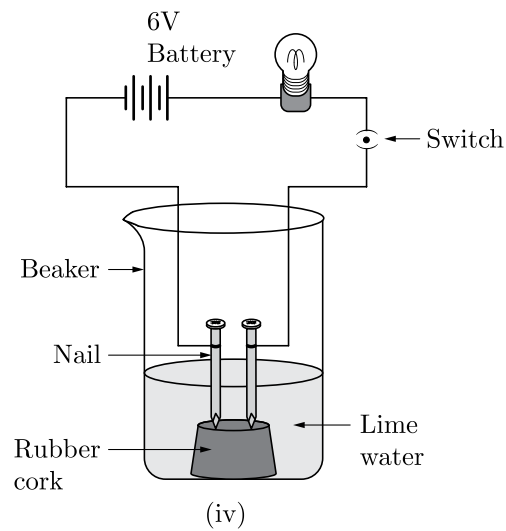
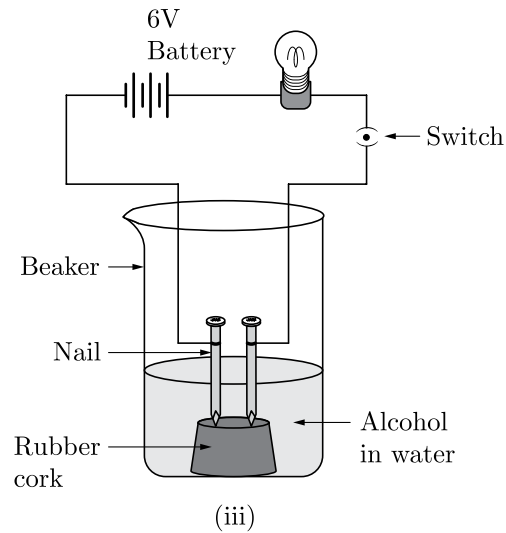
Identify the incorrect observations.

- (i) It is an endothermic reaction.
  - (ii) Slaked lime is produced.
  - (iii) Quick lime is produced.
  - (iv) It is an exothermic reaction.
  - (v) It is a combination reaction.
- (a) (iii) and (iv)
  - (b) (i) and (ii)
  - (c) (ii), (iv) and (v)
  - (d) (i) and (iii)

15. In which of the following setups would the bulb glow?



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- (a) (i) and (iv)
- (b) (i) and (ii)
- (c) (i), (ii) and (iv)
- (d) (ii), (iii) and (iv)

16. If two parents have the genotypes  $AA \times aa$ , the probability of having an  $aa$  genotype in the  $F_1$  generation is:
- (a) 50 per cent
  - (b) 25 per cent
  - (c) None of these
  - (d) 75 per cent

**Question no. 17 to 20 are Assertion-Reasoning based questions.**

- 17. Assertion (A):** Accumulation of variation in a species increases the chances of its survival in changing environment.  
**Reason (R):** Accumulation of heat resistance in some bacteria ensure their survival even when temperature in environment rises too much.
- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
  - (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
  - (c) Assertion (A) is true but Reason (R) is false.
  - (d) Assertion (A) is false but Reason (R) is true.
- 18. Assertion (A):** Domestic circuits are connected in parallel  
**Reason (R):** Parallel circuits have same current in every part of the circuit
- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
  - (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
  - (c) Assertion (A) is true but Reason (R) is false.
  - (d) Assertion (A) is false but Reason (R) is true.
- 19. Assertion (A):** It is necessary to separate oxygenated and de-oxygenated blood in mammals and birds.  
**Reason (R):** Mammals and birds are warm blooded animals and they depend on environment for their body temperature regulation.
- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
  - (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
  - (c) Assertion (A) is true but Reason (R) is false.
  - (d) Assertion (A) is false but Reason (R) is true.
- 20. Assertion (A):** Decomposition of vegetable matter into compost is an endothermic reaction.  
**Reason (R):** Decomposition reaction involves breakdown of a single reactant into simpler products.
- (a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
  - (b) Both Assertion (A) and Reason (R) are true but Reason (R) is not the correct explanation of Assertion (A).
  - (c) Assertion (A) is true but Reason (R) is false.
  - (d) Assertion (A) is false but Reason (R) is true.

## SECTION-B

**Question no. 21 to 26 are very short answer questions.**

- 21.** How can change of size of eyeball be one of the reason for:
- (i) Myopia
  - (ii) Hypermetropia
- Compare the size of eyeball with that of a normal eye in each case. How does this change of size affect the position of image in each case?

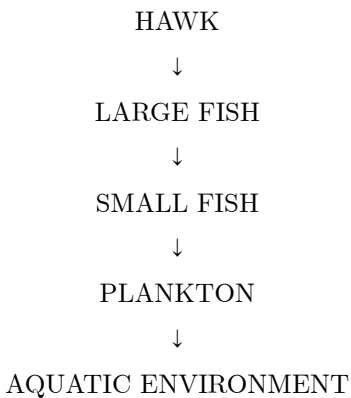
**or**

State the cause of dispersion of white light by a glass prism. Draw a labelled diagram to illustrate the recombination of the spectrum of white light. Why is it essential that the two prisms used for the purpose should be identical and placed in an inverted position with respect to each other?

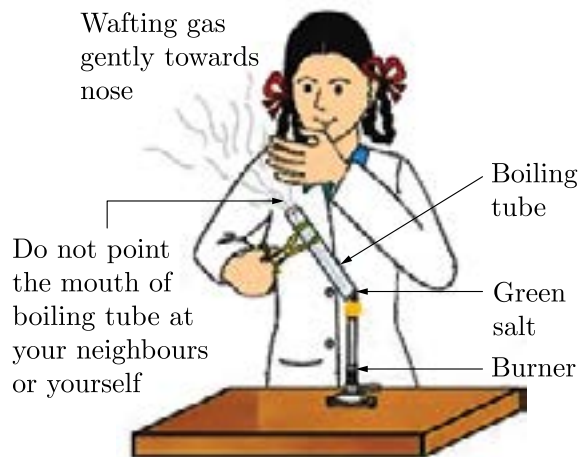
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22. How is  $O_2$  and  $CO_2$  transported in human beings?
23. DDT was sprayed in a lake to regulate breeding of mosquitoes. How would it affect the trophic levels in the following food chain associated with a lake? Justify your answer.



24. List two different functions performed by pancreas in our body.
25. A green salt on heating decomposes to produce a colourless suffocating gas and leaves behind a reddish brown residue. Name the salt and write the decomposition reaction.



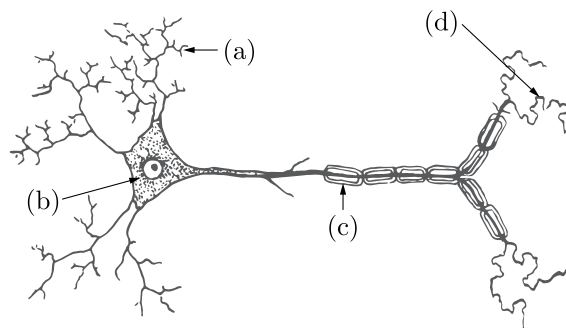
or

Give suitable reason for the following statements:

- (i) We feel burning sensation in the stomach when we overeat.
- (ii) The crystals of washing soda change to white powder on exposure to air.

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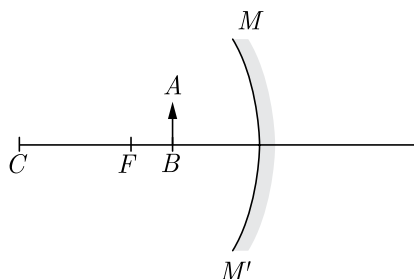
26. Label the parts of a neuron in the given figure:



## SECTION-C

Question no. 27 to 33 are short answer questions.

27. (i) Draw ray diagram to show the principal focus of  
 (a) a concave mirror, and  
 (b) a convex mirror.
- (ii) In the following diagram, MM is a concave mirror and AB is an object. Draw on your answer sheet a ray diagram to show the formation of image of this object.



28. (i) Write the essential condition for the following reaction to take place:  
 $2\text{AgBr} \longrightarrow 2\text{Ag} + \text{Br}_2$   
 Write one application of this reaction.
- (ii) Complete the following chemical equation of a chemical reaction:  
 $2\text{FeSO}_4 \xrightarrow{\text{Heat}} \text{Fe}_2\text{O}_3 + \dots + \dots$
- (iii) What happens when water is added to quick lime? Write chemical equation.

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29. (i) Name the poles P, Q, R and S of the magnets in the following figures a and b.

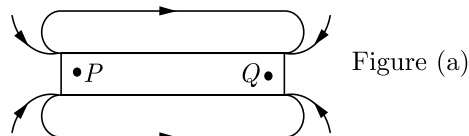


Figure (a)

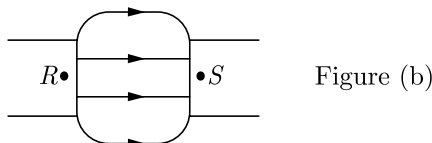


Figure (b)

- (ii) State the inference drawn about the direction of the magnetic field lines on the basis of these diagrams.

or

State right-hand thumb rule to determine the direction of magnetic field around a current carrying conductor. Apply this rule to find the direction of magnetic field inside and outside a circular loop of wire lying in the plane of a table and current is flowing through it clockwise.

30. The table below shows the colour of universal indicator paper (UI paper) at different pH values.

Colour	Orange		Green		Blue		Purple							
pH	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Colour	Red		Yellow		Dark green		Dark blue							
	Acid		Neutral				Alkali							

- (i) UI paper turns purple in oven cleaner solution. What is the pH of oven cleaner solution?  
 (ii) Suggest the substance in oven cleaner solution that turns UI paper purple.  
 (iii) UI paper turns yellowish-green in milk. What is the pH of milk?  
 (iv) The milk was left outside for five days. When the milk was re-tested with UI paper, the paper turned orange. What has happened to the milk?

31. How can we help in reducing the problem of waste disposal? Suggest any three methods.

32. Describe the structure and function of the basic filtering unit of kidney.

or

How does nutrition take place in Amoeba? How is it different in Paramecium?

33. A student wants to project the image of a candle flame on a screen 80 cm in front of a mirror by keeping the candle flame at a distance of 20 cm from its pole.

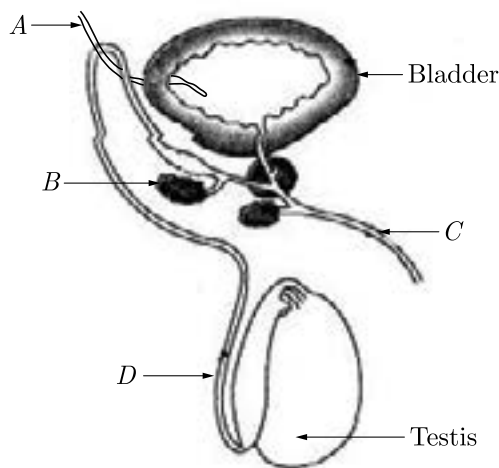
- (i) Which type of mirror should the student use?  
 (ii) Find the magnification of the image produced.  
 (iii) Find the distance between the object and its image.  
 (iv) Draw a ray diagram to show the image formation in this case and mark the distance between the object and its image.

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## SECTION-D

Question no. 34 to 36 are Long answer questions.

34. Based on the given diagram, answer the questions given below:



- (i) Label the parts A, B, C and D.
- (ii) Name the hormones secreted by testis and mention its role.
- (iii) State the functions of B and C in the process of reproduction.

or

- (i) Draw a diagram showing germination of pollen on stigma of a flower and mark on it the following organs/parts:
  - (a) Pollen grain
  - (b) Pollen tube
  - (c) Stigma
  - (d) Female germ-cell
- (ii) State the significance of pollen tube.
- (iii) Name the parts of flower that develop after fertilisation into:
  - (a) Seed
  - (b) Fruit

35. A metal  $M$  is stored under kerosene. It vigorously catches fire, if a small piece of this metal is kept open in air. Dissolution of this metal in water releases great amount of energy and the metal catches fire. The solution so formed turns red litmus blue.

- (i) Name the metal  $M$ .
- (ii) Write formula of the compound formed when this metal is exposed to air.
- (iii) Why is metal  $M$  stored under kerosene?
- (iv) If oxide of this metal is treated with hydrochloric acid, what would be the products?
- (v) Write balanced equations for:
  - (a) Reaction of ' $M$ ' with air.
  - (b) Reaction of ' $M$ ' with water.
  - (c) Reaction of metal oxide with hydrochloric acid.

or

- (i) Write the steps involved in the extraction of pure metals in the middle of the activity series from their carbonate ores.
- (ii) How is copper extracted from its sulphide ore? Explain the various steps supported by chemical equations. Draw labelled diagram for the electrolytic refining of copper.

36. Soaps and detergents are both types of salts. State the difference between the two. Write the mechanism of the cleansing action of soaps. Why do soaps not form lather (foam) with hard water? Mention any two problems that arise due to the use of detergents instead of soaps.

or

A compound A ( $C_2H_4O_2$ ) reacts with Na metal to form a compound 'B' and evolves a gas which burns with a pop sound. Compound 'A' on treatment with an alcohol 'C' in presence of an acid forms a sweet smelling compound 'D' ( $C_4H_8O_2$ ). On addition of NaOH to 'D' gives back B and C. Identify A, B, C and D. Write the reactions involved.

## SECTION-E

Question no. 37 to 39 are case-based/data-based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. The modes by which various organisms reproduce depend on the body design of the organisms. In asexual reproduction, a single individual parent produces offsprings without the involvement of gametes. This method is a common means of increasing the offsprings rapidly under favourable conditions. Asexual reproduction occurs mostly in unicellular organisms, some plants and certain simple multicellular animals.

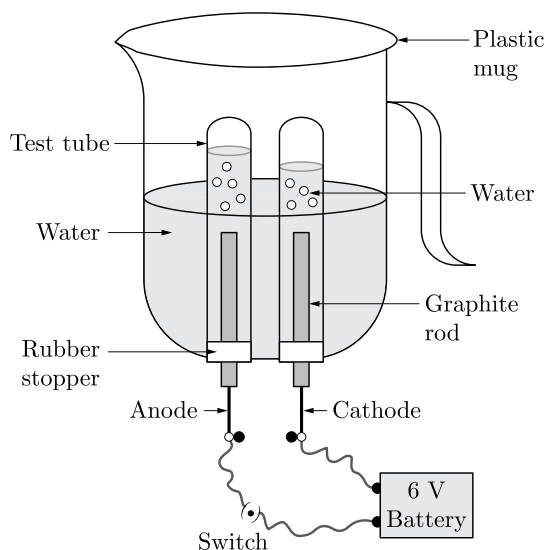
- State the name of the organism in which binary fission takes place in a definite orientation. Also name the disease caused by this organism.
- Leaves of 'Bryophyllum' when they fall on the soil develop into new plants whereas a banana leaf will not be able to do so. Why?
- Explain the process of budding in Hydra.

or

- What happens when:
  - a Spirogyra filament matures and attains a considerable length and
  - a sporangia in Rhizopus bursts on maturation?

38. Electrolysis of water is a popular method used for different applications in various industries. The electrolysis of water is mainly carried out to yield pure hydrogen and oxygen gases. It involves passing an electric current through the water which results in decomposition of water into hydrogen and oxygen.

Pure water is a poor conductor of electricity. Sulphuric acid is added to the water so that the conductance of water increases which makes the reaction faster. The setup for electrolysis of water is given below:



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The number of hydrogen molecules produced in electrolysis is twice the number of oxygen molecules. Also, hydrogen is double in volume than oxygen.

- (i) Name the gases evolved at cathode and anode respectively. Why is volume of one gas collected at one electrode is double of anode?
- (ii) How will you test the gas evolved at cathode and at anode?

**or**

- (iv) Write the chemical equation for electrolysis of water.  
Why are few drops of  $\text{H}_2\text{SO}_4$  added to pure water?

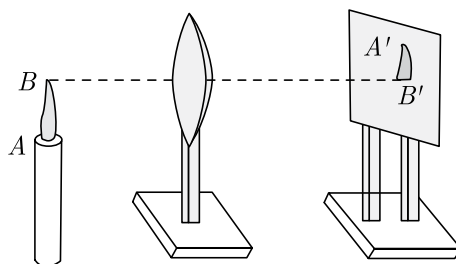
- 39.** Aditya and his friend Manoj placed a candle flame in front of a convex lens at various distances from it and obtained the image of the candle flame on a white screen.

He noted down the position of the candle, screen and the lens as under

Position of candle = 20 cm

Position of convex lens = 50 cm

Position of the screen = 80 cm



- (i) What is the position of the image formed from the convex Lens?
- (ii) What is the focal length of the convex lens?

**or**

Where will the image be formed, if he shifts the candle towards the lens at a position of 35 cm?

- (iii) What is the nature of the image formed if Aditya shifts the candle towards the lens to 36m?