

KENDRIYA VIDYALAYA SANGATHAN, CHENNAI REGION

SECOND PRE-BOARD EXAMINATION – 2025-26

SCIENCE (CODE – 086)

CLASS X

MAX MARKS – 80

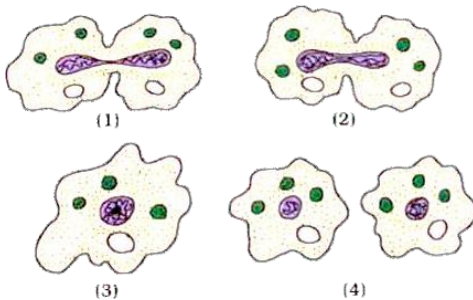
TIME – 3 HOURS

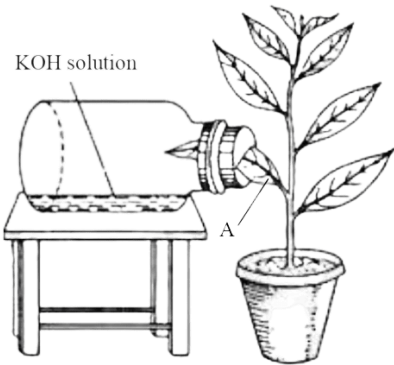
General Instructions:

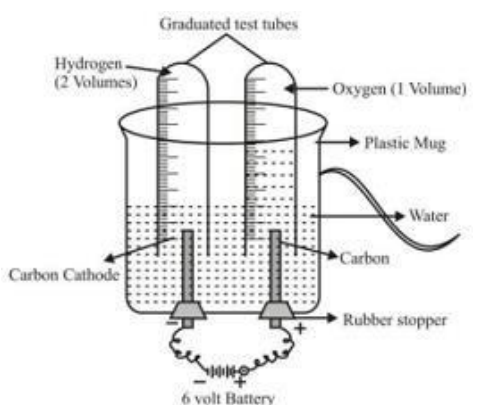
- (i) This question paper consists of 39 questions in 3 sections. Section- A is Biology, Section -B is Chemistry and Section - C is Physics.
- (ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- (iii) Student will divide the answer book in three sections A,B and C
- (iv) Reply of questions are to be written only within the space identified for concern section only .
- (v) In case replies are mixed these will not be evaluated and no marks will be awarded.

SECTION A

1	A student sets up an experiment to study the role of enzymes in digestion of food. Digestion of protein will take place in: Test tube A – chana + Pepsin Test tube B – Chana + Pepsin+ HCl A. test tube A as pepsin will breakdown complex molecules into simple molecules. B. test tube B as HCl will breakdown protein into simple molecules. C. test tubes A as pepsin will breakdown protein into simple molecules. D. test tube B as HCl will activate pepsin for breakdown of protein into simple molecules.	1
2	A person accidentally touches a hot pan and immediately withdraws his hand before feeling the pain. Which option correctly explains the sequence of events? A. Brain → Spinal cord → Motor neuron → Muscle B. Receptor → Sensory neuron → Spinal cord → Motor neuron C. Receptor → Motor neuron → Brain → Muscle D. Sensory neuron → Brain → Spinal cord → Muscle	1
3	A student observed the following changes in yeast cells under a microscope: • A small outgrowth formed on the parent cell • The outgrowth grew larger • It separated to form a new organism Which type of reproduction does this represent? A. Spore formation B. Fragmentation C. Budding D. Regeneration	1
4	During vigorous exercise, a student experiences muscle cramps. Which option best explains the <i>sequence of events</i> leading to this condition? A. Increased oxygen supply → Aerobic respiration → Lactic acid formation B. Decreased oxygen supply → Anaerobic respiration → Lactic acid accumulation C. Increased CO₂ production → Anaerobic respiration → Water accumulation D. Reduced glucose supply → Aerobic respiration → Fatigue	1
5	A heterozygous tall plant (Tt) is crossed with a dwarf plant (tt). What percentage of the offspring is expected to be tall in F₁ generation? A. 0% B. 25% C. 50% D. 75%	1

6	If plants trap 5000 J of energy, how much energy will be available to primary consumers? A. 50 J A. 100 J B. 500 J D. 1000 J	1
Assertion (A) and Reason (R). Answer Que 7 and 8 questions by selecting the appropriate option given below: a) Both A and R are true, and R is the correct explanation of A. b) Both A and R are true, and R is not the correct explanation of A. c) A is true but R is false. A is false but R is true.		
7	Assertion (A): In monohybrid crosses, only one pair of contrasting traits is considered. Reason (R): The F₂ generation of a monohybrid cross always shows a 3:1 phenotypic ratio	1
8	Assertion (A): Only 1% of energy is transferred from one trophic level to next. Reason (R): Most of the energy is lost as heat during respiration and activities.	1
9	When do desert plants take up carbon dioxide and perform photosynthesis? Explain in brief	2
10	a) Write the equation for aerobic respiration in mitochondria b) Give the equation anaerobic respiration in muscle cell	2
11	Study the diagram given below:  a) Identify the process b) Which organism uses the above method for reproduction? c) How above method is different from fragmentation?	3
12	In a cross between plants with pink flowers and plants with white flowers, the offsprings of F₁ generation all had pink flowers. When the F₁ generation was self-crossed, it was observed in the F₂ generation that 75 flowers out of 100, were pink. Make a cross ('P' for pink and 'p' for white) and answer the following: (i) What are the genotypes of the F₂ progeny? (ii) What is the ratio of Pink: White flowers in the F₂ generation?	3
13	How is ozone layer formed? Write down the chemical equation Ozone layer is important. Explain why? What are the two health hazards due to depletion of ozone layer	3

14	The diagram given below represents an experiment to prove the importance of a factor in photosynthesis. Answer the questions that follow:  a) Which factor is being studied here? b) What is the purpose of keeping KOH in the flask? c) What will you observe when the leaf A is tested for starch? Draw and explain (or) c) Explain the term Photosynthesis Write a well-balanced chemical equation for the process of photosynthesis.	4
15	What are animal hormones? List their characteristics Name the hormone a) Which brings about the changes in humans during the beginning of adolescence? b) Which hormones coordinate the level of sugar in the blood? (OR) a) What is reflex arc? b) Represent a reflex arc using a flow chart c) How do muscles move?	5
SECTION B		
16	A student burns ethanol and notices: • A blue flame • Formation of CO_2 and water • Heat is released Which type of reaction is taking place? A. Substitution B. Oxidation (Combustion) C. Neutralization D. Polymerization	1
17	A student sprinkles baking soda (NaHCO_3) on a lemon slice. Bubbles appear immediately. Why? A. Salt reacts with lemon pigments B. Acid–base reaction releases CO_2 C. Lemon juice evaporates quickly D. Baking soda absorbs water	1
18	Which statement best explains why aluminium is used for overhead electrical cables? A. It is the lightest metal B. It has very high conductivity and is corrosion resistant C. It is a poor conductor but cheap D. It reacts strongly with air	1
19	Which of the following is true for members of the same homologous series? A. Different functional groups, same chemical properties B. Same functional group, different chemical properties C. Same functional group, similar chemical properties, differ by $-\text{CH}_2-$ unit D. Random physical and chemical properties	1

20	A white powder (X) combines with water to form a hard solid (Y) used for construction purposes. X and Y are most likely: A. CaO and Ca(OH)₂ B. CaCO₃ and CaO C. CaSO₄ and CaO D. Ca(OH)₂ and CaCO₃	1
21	A student observes that adding NaHCO₃ to acetic acid produces a brisk effervescence. When the gas is passed through lime water, it turns milky. Which inference is correct? A. Gas released is CO₂; NaHCO₃ acts as an oxidizing agent B. Gas released is CO₂; reaction is neutralization + decomposition C. Gas released is H₂; NaHCO₃ is a strong base D. Gas released is H₂O vapor; lime water test is invalid	1
22	A metal M forms a green deposit when exposed to moist air. Which option correctly identifies M and the compound formed? A. Iron – Rust B. Copper – Basic copper carbonate C. Aluminium – Aluminium oxide D. Silver – Silver sulphide	1
Assertion (A) and Reason (R). Answer Que 23 question by selecting the appropriate option given below: a) Both A and R are true, and R is the correct explanation of A. b) Both A and R are true, and R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.		
23	Assertion (A): Soap does not produce lather in hard water. Reason (R): Soap reacts with Ca²⁺ and Mg²⁺ ions to form insoluble salts (scum).	1
24	Compound X and aluminium are used to join the railway tracks a) Identify the compound X? b) Name the reaction. c) Write the balanced equation for it.	2
25	Observe the following diagram  a) Name the reaction is taking place above apparatus? b) What are other type of similar reaction taking place, define it with proper example	3
26	a) Carbon cannot reduce the oxides of sodium, magnesium and aluminium to their respective metals. Why? (b) How are these metals obtained from their ores? (c) Write the reactions involved in extraction of sodium from molten sodium chloride.	3
27	In the following schematic diagram for the preparation of hydrogen gas as shown in Figure 2.3, what would happen if following changes are made?	4

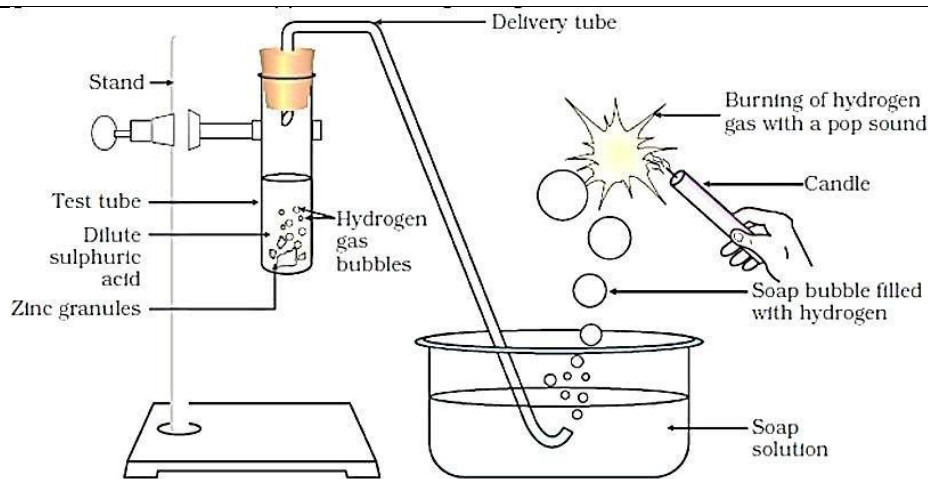


Fig. 2.3

- (a) In place of zinc 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 zinc, copper turnings are taken
 (or)
 (c) Sodium hydroxide is taken in place of dilute sulphuric acid and the tube is heated.

28 Ethanol ($\text{C}_2\text{H}_5\text{OH}$) is a common alcohol used as a solvent and fuel, belonging to the alcohol homologous series. This series includes **Methanol (CH_3OH)**, **Propanol ($\text{C}_3\text{H}_7\text{OH}$)**, and Butanol ($\text{C}_4\text{H}_9\text{OH}$). Members share the same functional group ($-\text{OH}$) differing by a CH_2 unit, showing a gradual change in physical properties like boiling point but similar chemical properties.

- a) Define Homologous Series
 b) Identify the Functional Group in Butanol and name the next homologue member in this series .
 c) Draw the electron dot structure of Butanol

(OR)

Carbon's ability to form stable single, double, and triple bonds, along with its tetravalency, allows it to form long chains, branched chains, and rings, leading to a vast number of organic compounds a phenomenon called isomerism, specifically structural isomerism. Compounds like butane (C_4H_{10}) and pentane (C_5H_{12}) have different arrangements of carbon atoms

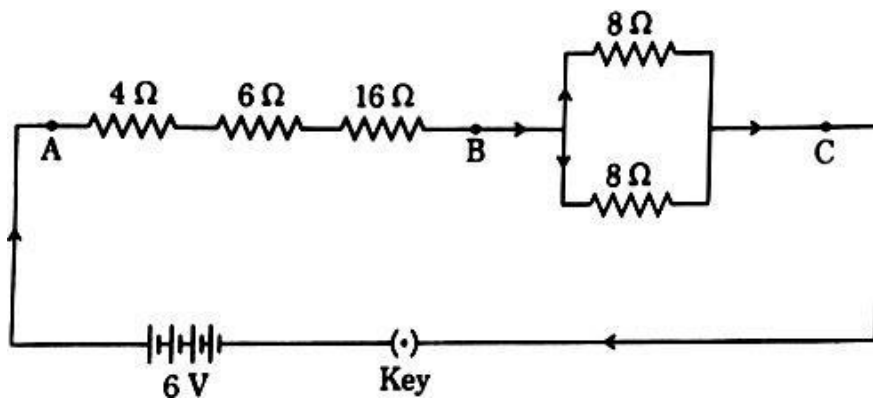
- a) Define structural isomerism
 b) Draw and name the three structural isomers of Pentane
 c) Why cyclohexane is not an isomer of hexane. C_6H_{14} Give reason
 Give one structural isomer of Butane?

SECTION C

29 A student sees distant objects shimmering above a hot road. Which optical phenomenon explains this?
 A. Total internal reflection
 B. Mirage formation due to atmospheric reflection
 C. Dispersion of sunlight
 D. Reflection from water puddle

30 Two wires of same material and length but different cross-sectional areas ($A_1 > A_2$) are connected to the same battery. Which statement is correct about current?
 A. Current through both wires is same
 B. Current through thicker wire (A_1) is greater
 C. Current through thinner wire (A_2) is greater
 D. Current depends on battery voltage only

31	Which of the following correctly describes the magnetic field near a long straight wire? a) The field consists of straight lines perpendicular to the wire. b) The field consists of straight lines parallel to the wire. c) The field consists of radial lines originating from the wire. d) The field consists of concentric circles centered on the wire.	1
Assertion (A) and Reason (R). Answer Que 32 and 33 questions by selecting the appropriate option given below: a) Both A and R are true, and R is the correct explanation of A. b) Both A and R are true, and R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.		
32	Assertion (A): A concave lens can produce a magnified image of a nearby object. Reason (R): When an object is placed between the focal point and the convex lens, the lens forms a virtual, erect, and magnified image.	1
33	Write the relation between resistance and electrical resistivity of the material of a conductor in the shape of a cylinder of length 'l' and area of cross-section 'A' Hence derive the SI unit of electrical resistivity.	2
34	a) Define the power of accommodation b) Write the modification in the curvature of the eye lens which enables us to see the nearby objects clearly	2
35	What are the two advantages of connecting electric devices in parallel with the battery instead of in series?	2
36	<u>Attempt either option A or B</u> A.. The focal length of a concave lens is 20 cm. At what distance from the lens would a 5 cm tall object be placed so that its image is formed at a distance of 15 cm from the lens? Also calculate the size of the image formed. OR B. Draw ray diagrams to show the nature, position, and relative size of the image formed by a convex mirror when the object is placed (i) at infinity and (ii) between infinity and pole P of the mirror.	3
37	A student fixes a sheet of white paper on a drawing board. He places a bar magnet in the centre of it. He sprinkles some iron filings uniformly around the bar magnet. Then he taps the drawing board gently and observes that the iron filings arrange themselves in a particular pattern. (a) Why do iron filings arrange in a particular pattern? (b) What does the crowding of iron filings at the ends of the magnet indicate? (c) What do the lines, along which the iron filings align, represent?	3
38	A student performs an activity using a concave mirror. He places an object at different positions in front of the mirror. When the object is placed between F and C, he observes that the image formed is real, inverted, and enlarged. However, when he places the object between the pole (P) and focus (F), the image formed is virtual, erect, and magnified behind the mirror. 1. State one difference between real and virtual images. 2. Concave mirrors are used by dentists. Which image property makes them useful for this purpose? 3. What is the nature of the image formed when the object is placed beyond C? Draw Ray diagram for it (OR) 3. Where will the image be formed when the object is placed at C? Draw Ray diagram for it	4



On the basis of this circuit, answer the following questions:

- (a) Find the value of total resistance between the points A and B.
- (b) Find the resistance between the points B and C.
- (c) (i) Calculate the current drawn from the battery, when the key is closed.

(or)

- (c) (ii) In the above circuit, the $16\ \Omega$ resistor or the parallel combination of two resistor of $8\ \Omega$ which one of the two will have more potential difference across its two ends? Justify your answer.

(OR)

B) a)What is Electric power? Give its SI unit.

b)Which uses more energy a 250 W TV set in 1 hr or a 1200W toaster in 10 min?

c)An electric iron of resistance 20ohms takes a current of 5 A. Calculate the heat developed in30s.