

MODEL QUESTION PAPER 2027
SCIENCE AND TECHNOLOGY — PART I
Std. X (S.S.C.) · Maharashtra State Board

Time: 2 Hours

Max. Marks: 40

General instructions:

- (1) All questions are compulsory.
- (2) Use of a calculator is not allowed.
- (3) The numbers to the right of the questions indicate full marks.
- (4) For every MCQ [Q. 1(A)], only the first attempt will be evaluated.
- (5) Draw scientifically correct, labelled diagrams wherever necessary.

Q. 1.

(A) Choose the correct alternative:

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- (i) The focal length of a convex lens is 40 cm. What is its power?
- (ii) Give scientific reason: Tungsten metal is used to make a solenoid type coil in an electric bulb.
- (iii) In of the modern periodic table, are the non-metals found. (A) s-block (B) p-block (C) d-block (D) f-block
- (iv) is the functional group of carboxylic acid. (a) -OH (b) -CHO (c) -NH₂ (d) -COOH
- (v) Alkaline earth metals have valency 2. This means that their position in the modern periodic table is in (A) Group 2 (B) Group 16 (C) Period 2 (D) d-block

(B) Answer the following subquestions:

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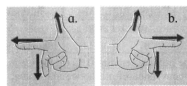
- (i) Complete the co-relation: Cooking of food : Chemical change :: Evaporation of water :
- (ii) Match the columns: Column 'A' - Simple microscope; Column 'B' - (a) used to observe minute objects (b) used to see distant objects (c) used for watch repair
- (iii) What is the wavelength of violet ray in dispersion of light?
- (iv) Identify the hydrocarbon from the given structural formula: H-C-C-H with hydrogen atoms shown on each carbon (ethane structure).
- (v) Find the odd one out: Loudspeaker, microphone, electric motor, magnet.

Q. 2.

(A) Give scientific reasons (any TWO):

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- (i) 'A rainbow is the combined effect of refraction, dispersion and total internal reflection of light'. Explain the sentence.
- (ii) Name the following diagrams and explain the concept behind them (hand diagrams a and b showing Fleming's rules).



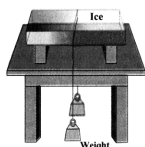
- (iii) Define: (a) Ores (b) Gangue.

(B) Answer the following subquestions (any THREE):

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- (i) Give scientific reason: Geostationary satellites are not useful for studies of polar regions.
- (ii) An electric tungsten bulb is connected into a home circuit. The home electric supply runs at 220 V potential difference. When switched on, a current of 0.45 A flows through the bulb: (a) What must be power (wattage) of the bulb? (b) If it is kept on for 10 hours, how many units of electricity will be consumed?
- (iii) Read the passage and answer: [context: space debris - non-functional satellites and launcher parts revolving around the earth that can damage satellites]. (a) What is meant by space debris? (b) How can it be harmful to the artificial satellites? (c) What efforts are being taken to manage it?

- (iv) Observe the figure (a weighted wire passing through a block of ice) and answer: (a) Name the phenomenon shown in the figure. (b) Define the above phenomenon.



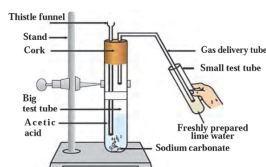
- (v) Give scientific reason: Elements belonging to the same group have the same valency.

Q. 3.

Answer the following subquestions (any FIVE):

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- (i) State the factors affecting the rate of chemical reaction. Explain any one of it.
 (ii) Observe the figure and answer: (a) Which gas is released out as effervescence in the big test tube? (b) What is the colour change in the lime water? (c) Write the related chemical equation.



- (iii) State whether the following reactions are endothermic or exothermic: (a) $\text{HCl} + \text{NaOH} \rightarrow \text{NaCl} + \text{H}_2\text{O} + \text{Heat}$ (b) $2\text{KClO}_3(\text{s}) \rightarrow 2\text{KCl}(\text{s}) + 3\text{O}_2$ (c) $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca}(\text{OH})_2 + \text{Heat}$.
 (iv) Write demerits of Mendeleev's periodic table.
 (v) State the laws related to the given diagram (a planet revolving around the sun in an orbit).

(ii) Draw a neat labelled diagram of Hope's Apparatus.

(iii) State the Laws of Refraction.

(iv) Answer the following :

(a) Name the main ore of aluminium.

(b) What impurities are present in aluminium ore ?

- (vi) Read the paragraph and answer: [context: heat is exchanged between a hot and cold object until both attain the same temperature in an isolated system]. (a) Heat is transferred from where to where? (b) Which principle do we learn from this process? (c) How will you state the principle briefly?

(vii) Complete the following table (Type of satellite / Function / names of Indian satellite series and their launch vehicles): (a) location fixing, (b) Weather satellite, (c) IRS with launcher PSLV.

(viii) An element has its electronic configuration as 2, 8, 2. Now answer: (a) What is the atomic number of this element? (b) To which period does this element belong?

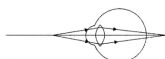
Q. 4.

Answer the following subquestions (any ONE):

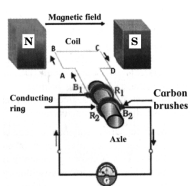
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- (i) Observe the following figure and answer: (a) Name the defect of vision represented in the above figure. (b) State the reasons for this defect. (c) How is it corrected? (d) Draw the diagram to show the correction of this defect.

(ii) Observe the following figure and answer the questions given below :



(ii) Observe the following diagram (an appliance with a coil between magnetic poles N and S) and answer: (a) Identify the above diagram. (b) Write the principle on which the above appliance works. (c) Write the working of the above appliance. (d) Write the use of the above appliance.



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