

**SCIENCE**  
**Sample Question Paper 1**  
**Class X | Code 086 | 2026-27**

Time Allowed: 3 Hours

Maximum Marks: 80

**General Instructions**

1. This paper has 39 questions in three sections: A Biology, B Chemistry and C Physics.
2. All questions are compulsory. Internal choices are provided in three questions in each section. Attempt only one alternative in each such question.
3. Marks are shown against each question. Draw neat, labelled diagrams wherever required.
4. For Questions 8, 9, 24 and 32, use the Assertion–Reason answer codes given before Question 8.

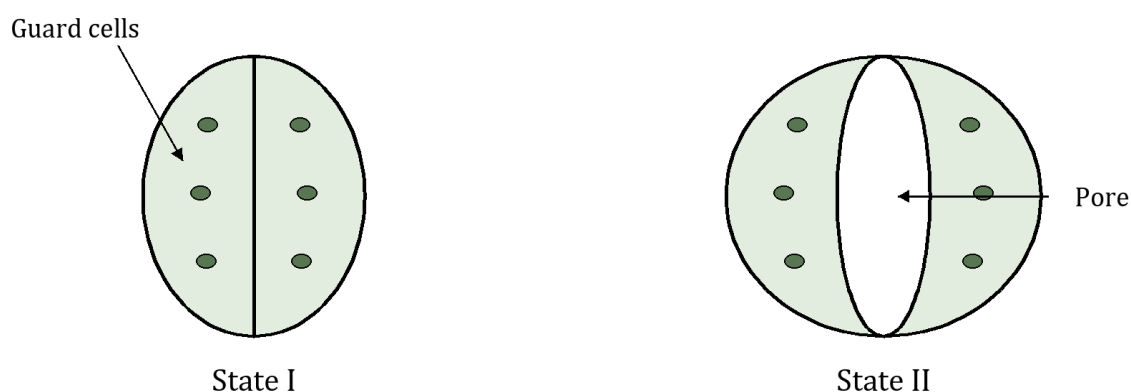
**SECTION A**

(Biology | Questions 1–16 | 30 marks)

**1. Bile helps in the digestion of fats mainly by:** **[1]**

- (a) converting fats directly into amino acids.
- (b) breaking large fat globules into smaller droplets.
- (c) converting starch into simple sugars.
- (d) making the contents of the small intestine acidic.

**2. The two states of a stoma are shown below. Which change in the guard cells causes state I to change into state II?** **[1]**



- (a) Loss of water and decrease in turgidity
- (b) Loss of chlorophyll and decrease in size
- (c) Entry of water and increase in turgidity
- (d) Entry of carbon dioxide and breakdown of the cell wall

**3. In a neuron, the electrical signal triggers the release of a chemical messenger at the:** **[1]**

- (a) cell body.
- (b) axonal end.
- (c) dendritic end.
- (d) nucleus.

4. A small outgrowth develops on a yeast cell, receives a daughter nucleus and separates. This mode of reproduction is: [1]

- (a) fragmentation. (b) binary fission.  
(c) spore formation. (d) budding.

5. Vasectomy blocks the vas deferens and tubectomy blocks the oviducts. Which common biological event do these procedures prevent? [1]

- (a) Production of sperm and eggs  
(b) Implantation of a fertilised egg  
(c) Meeting and fusion of male and female gametes  
(d) Release of testosterone and oestrogen

6. The male gamete of an apple plant contains 17 chromosomes. The number of chromosomes in the female gamete and in a normal body cell of the adult plant, respectively, is: [1]

- (a) 17 and 17. (b) 17 and 34.  
(c) 34 and 34. (d) 34 and 51.

7. A persistent pesticide enters this food chain: grass → grasshopper → frog → snake. Its concentration is expected to be highest in the: [1]

- (a) grass. (b) grasshopper.  
(c) frog. (d) snake.

**Assertion–Reason answer codes for Questions 8, 9, 24 and 32**

- 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.

8. Assertion (A): Alveoli provide a large surface area for exchange of gases. Reason (R): Alveoli have thick, impermeable walls that slow down diffusion. [1]

9. Assertion (A): Energy is recycled from decomposers back to producers in an ecosystem.

Reason (R): Energy is lost as heat at successive trophic levels. [1]

10. Attempt either A or B. [2]

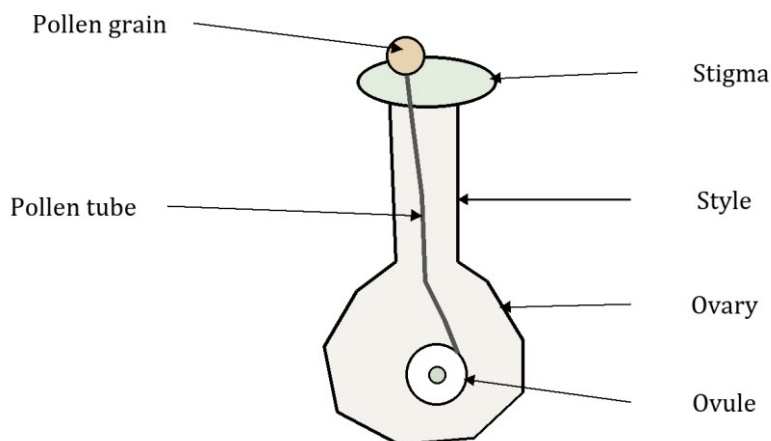
A. A ring of bark containing phloem is removed from a woody stem without damaging the xylem. Which transport process is directly affected? Explain why the leaves may still receive water initially. (2)

**OR**

B. State two functions of transpiration in a plant. (2)

**11.** Distinguish between sensory and motor neurons on the basis of the direction in which they carry impulses. [2]

**12.** Study the labelled diagram of a pistil. [2]



(a) State the function of the pollen tube. (1)

(b) After fertilisation, what do the ovule and the ovary develop into, respectively? (1)

**13.** Two heterozygous tall pea plants (Tt) are crossed. Tallness is dominant over dwarfness. [3]

(a) List the gametes produced by each parent. (1)

(b) Write the four possible offspring genotypes. (1)

(c) State the expected phenotypic ratio of tall to dwarf offspring. (1)

**14.** Explain how ozone is formed in the upper atmosphere. Why is the ozone layer essential for life on Earth? [3]

**15.** A student compares three processes: respiration in human muscle during vigorous exercise, respiration in yeast without oxygen, and respiration in well-oxygenated human cells. In all three, glucose is first broken down to a three-carbon compound. [4]

(a) Name this three-carbon compound and the part of the cell where it is formed. (1)

(b) Name the substance whose accumulation in muscles may cause cramps during vigorous exercise. (1)

(c) Attempt either option below.

A. State the end products formed from this compound in yeast without oxygen. Name the type of respiration involved. (2)

**OR**

B. State the final products of its complete breakdown in the presence of oxygen. Name the cell organelle where this breakdown occurs. (2)

**16. Attempt either A or B. [5]**

A. (i) Trace the path of oxygenated blood from the lungs to the body and deoxygenated blood from the body back to the lungs, naming the chambers and major vessels involved. (3)

(ii) Why is this called double circulation? State one advantage of complete separation of oxygenated and deoxygenated blood in humans. (2)

**OR**

B. (i) Explain filtration and selective reabsorption during urine formation in a nephron. (3)

(ii) State two factors that determine the amount of water reabsorbed in the kidney tubules. (2)

## **SECTION B**

(Chemistry | Questions 17–29 | 25 marks)

**17. An iron nail is kept in copper sulphate solution. Which observation is correct? [1]**

- (a) Only the solution turns light green.
- (b) Only a brown deposit forms on the nail.
- (c) The solution turns light green and a brown deposit forms on the nail.
- (d) No change occurs.

**18. The chemical formula of baking soda is: [1]**

- (a)  $\text{Na}_2\text{CO}_3$ .
- (b)  $\text{NaHCO}_3$ .
- (c)  $\text{NaOH}$ .
- (d)  $\text{NaCl}$ .

**19. Soap forms scum in hard water, whereas a detergent produces lather easily. Which inference is correct? [1]**

- (a)  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  ions form insoluble salts with soap, but not with the detergent.
- (b) Soap is acidic, whereas every detergent is basic.
- (c)  $\text{Na}^+$  ions in hard water cause soap to form scum.
- (d) Detergents form lather because they precipitate  $\text{Ca}^{2+}$  and  $\text{Mg}^{2+}$  ions.

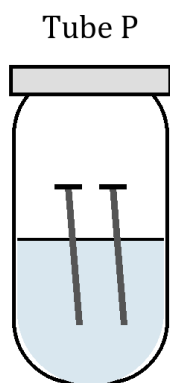
**20. Two successive members of the same homologous series differ in molecular formula by: [1]**

- (a)  $\text{CH}_4$ .
- (b)  $\text{CO}_2$ .
- (c)  $\text{CH}_2$ .
- (d)  $\text{H}_2\text{O}$ .

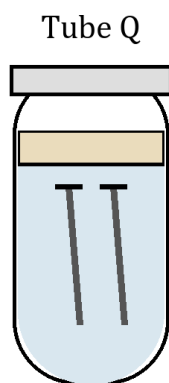
**21. Molten magnesium chloride conducts electricity because it contains: [1]**

- (a) free electrons only.
- (b) mobile ions.
- (c) neutral magnesium atoms only.
- (d) fixed ions that cannot move.

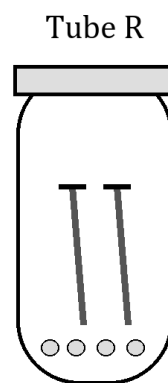
**22.** Three sealed test tubes containing clean iron nails are prepared as shown. In which tube will the nails rust appreciably after a few days? [1]



Air + water



Boiled water  
with oil layer



Dry air  
Anhydrous  $\text{CaCl}_2$

- (a) Tube P only
- (b) Tube Q only
- (c) Tube R only
- (d) Tubes Q and R only

**23.** During electrolytic refining of copper, the impure copper is used as the: [1]

- (a) cathode, which gains mass.
- (b) electrolyte.
- (c) anode, which dissolves gradually.
- (d) insulating container.

**24.** Assertion (A): Silver chloride is stored in dark-coloured bottles.

Reason (R): Silver chloride decomposes in sunlight to form silver and chlorine. [1]

**25.** What is rancidity? State two methods of preventing it. [2]

**26.** Attempt either A or B. [3]

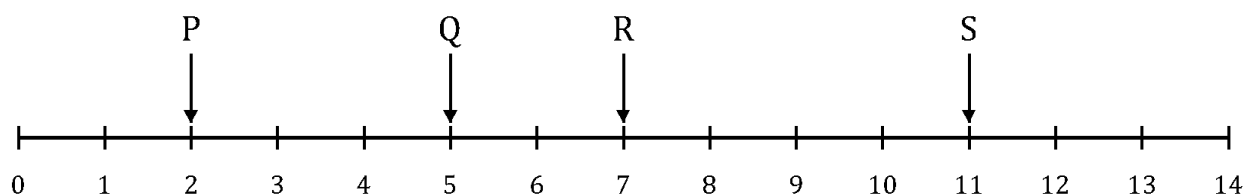
A. Zinc oxide is heated with carbon to obtain zinc. Write the balanced chemical equation, identify the reducing agent and explain why the same method cannot be used to obtain sodium from sodium oxide. (3)

**OR**

B. Iron(III) oxide reacts with aluminium in the thermit reaction. Write the balanced chemical equation, identify the reducing agent and state one practical use of this reaction. (3)

**27.** Define a combination reaction. Write balanced chemical equations for two combination reactions that are exothermic. [3]

**28.** A laboratory records the pH of four dilute aqueous solutions at room temperature. The readings are shown on the pH scale below. **[4]**



(a) Which solution has the highest concentration of  $H^+$  ions? (1)

(b) Which solution is neutral? (1)

(c) Attempt either option below.

A. Solution P is diluted with distilled water. State the direction in which its pH changes and explain this change in terms of  $H^+$  ion concentration. (2)

**OR**

B. A student has excess acid in the stomach. Explain why a mild base can provide relief and name the type of chemical reaction involved. (2)

**29.** Attempt either A or B. **[5]**

A. A compound X, used as a solvent, has the formula  $C_2H_5OH$ . On oxidation with alkaline potassium permanganate, it forms Y.

(i) Name X and Y and write the equation for this oxidation using [O]. (2)

(ii) Write the balanced equation for the reaction of Y with sodium carbonate. (1)

(iii) Y reacts with X in the presence of concentrated sulphuric acid. Name the product and the reaction, and state one use of such products. (2)

**OR**

B. A hydrocarbon X has the formula  $C_2H_4$ .

(i) State whether X is saturated or unsaturated and draw its electron-dot structure showing the bonds. (2)

(ii) Write the balanced equation for its conversion into  $C_2H_6$  and state the required catalyst. (1)

(iii) Write the balanced equation for its complete combustion and explain why a limited supply of oxygen may produce a sooty flame. (2)

## SECTION C

(Physics | Questions 30–39 | 25 marks)

**30.** A lens has power  $-4$  D. Its focal length is: **[1]**

(a) 4 m. (b)  $-40$  m.

(c)  $-0.25$  m. (d) 25 m.

**31.** An electrical appliance rated 1000 W is operated at 250 V. What current does it draw? [1]

(a) 0.25 A

(b) 2.5 A

(c) 4.0 A

(d) 10 A

**32.** Assertion (A): Stars appear to twinkle when viewed from Earth.  
Reason (R): Planets are also point sources of light and therefore twinkle as strongly as stars. [1]

**33.** The absolute refractive indices of media A, B and C are 1.3, 1.5 and 1.4, respectively. In which medium is light fastest and in which is it slowest? Give a reason. [2]

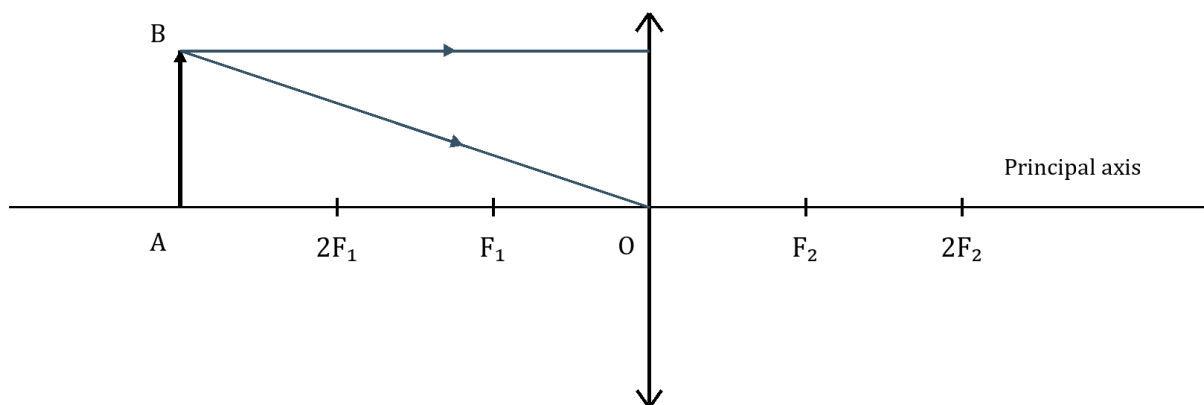
**34.** Attempt either A or B. [2]

A. State the nature of the magnetic field inside a long current-carrying solenoid. What happens to its north and south poles when the current is reversed? (2)

**OR**

B. A straight current-carrying conductor is placed perpendicular to a magnetic field. Name the rule used to find the direction of the force on it. What happens to the force direction if only the current direction is reversed? (2)

**35.** The diagram shows a convex lens and an object AB placed beyond  $2F_1$ . The two rays from B have been drawn only up to the lens. [3]



(a) Copy and complete the paths of the two rays to locate the image  $A'B'$ . (2)

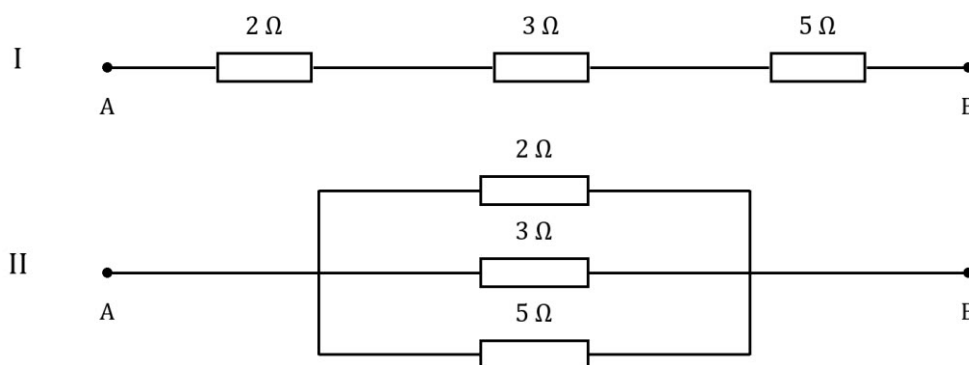
(b) State the size and orientation of the image relative to the object. (1)

**36.** Answer the following questions. [3]

(a) State the right-hand thumb rule and explain how it gives the direction of the magnetic field around a straight current-carrying conductor. (2)

(b) How does the magnetic field strength change as the distance from the conductor increases? (1)

**37.** The same three resistors are connected in arrangements I and II as shown. [3]



(a) Which arrangement gives the maximum equivalent resistance between A and B? Calculate it. (1)

(b) Which arrangement gives the minimum equivalent resistance between A and B? Calculate it. (2)

**38.** A household uses a 1000 W electric iron for 30 minutes and a 100 W lamp for 5 hours every day. Both appliances operate at their rated power. The electricity tariff is ₹6 per kWh. [4]

(a) Calculate the energy used by the iron in one day, in kWh. (1)

(b) Calculate the total daily energy used by both appliances, in kWh. (1)

(c) Attempt either option below.

A. Calculate the electricity cost for these two appliances for 30 days. (2)

**OR**

B. The 100 W lamp is replaced by a 20 W lamp used for the same duration. Calculate the energy saved in 30 days and the corresponding saving in cost. (2)

**39.** Attempt either A or B. [5]

A. A student can see nearby objects clearly but cannot see distant objects clearly.

(i) Name the defect and state where the image of a distant object forms in the uncorrected eye. (2)

(ii) State two possible causes of this defect. (2)

(iii) Name the type of lens used to correct it. (1)

**OR**

B. (i) Explain why a clear daytime sky appears blue. (2)

(ii) Why does the Sun appear reddish near the horizon at sunrise or sunset? (2)

(iii) Why does the sky appear dark to an astronaut in space? (1)