

SCIENCE
Sample Question Paper 2
Class X | Code 086 | 2026-27

Time Allowed: 3 hours

Maximum Marks: 80

General Instructions

This paper has 39 questions in three sections: A Biology, B Chemistry and C Physics.

All questions are compulsory. Three internal choices are provided in each section; attempt only one alternative wherever a choice is given.

Marks are shown against each question. Draw neat labelled diagrams wherever required.

For Questions 8, 9, 24 and 32, use the Assertion–Reason codes below:

- 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 A

(Biology | Questions 1–16 | 30 marks)

1. A green leaf kept in darkness for two days is tested with iodine. The most likely result is: **[1]**

- (A) blue-black colour due to chlorophyll
- (B) red colour due to oxygen
- (C) white precipitate due to glucose
- (D) no blue-black colour because stored starch has been used

2. When a shoot grows towards a window, the response is: **[1]**

- (A) positive geotropism
- (B) a reflex arc
- (C) positive phototropism
- (D) negative hydrotropism

3. Which chromosome is normally associated with male sex determination in humans? **[1]**

- (A) The mitochondrial chromosome only
- (B) Y
- (C) An X from each parent
- (D) Every autosome

4. If a sperm carrying X fertilises a human egg, the usual sex-chromosome combination is: **[1]**

- (A) XX
- (B) XY
- (C) YY
- (D) XO in every case

5. During photosynthesis, what happens to carbon dioxide and water as glucose is formed? [1]

- (A) Carbon dioxide gains hydrogen, while water loses electrons.
- (B) Carbon dioxide loses oxygen, while water gains oxygen.
- (C) Carbon dioxide is oxidised, while water is reduced.
- (D) Both carbon dioxide and water undergo reduction.

6. During urine formation, tubular reabsorption and secretion take place in the kidneys. Which of the following sets correctly indicates both the substances that are reabsorbed in the kidneys? [1]

- (A) Glucose and salts
- (B) Glucose and starch
- (C) Glycogen and salts
- (D) Glycogen and starch

7. Mendel's experiments used contrasting traits primarily to: [1]

- (A) prevent fertilisation
- (B) trace their inheritance clearly
- (C) avoid DNA replication
- (D) make every offspring sterile

8. Assertion (A): A reflex action can begin before a person consciously recognises danger.

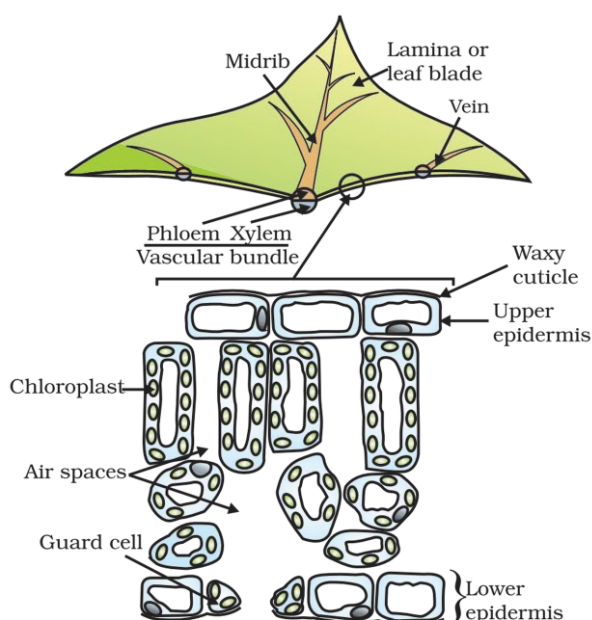
Reason (R): A reflex arc can process the response through the spinal cord. [1]

9. Assertion (A): A trait acquired by body-building is necessarily passed to offspring.

Reason (R): Inheritance depends on information transmitted through germ cells. [1]

10. Attempt either A or B. [2]

A. Study the leaf section. Explain how its air spaces and chloroplast-rich cells support photosynthesis. (2)



OR

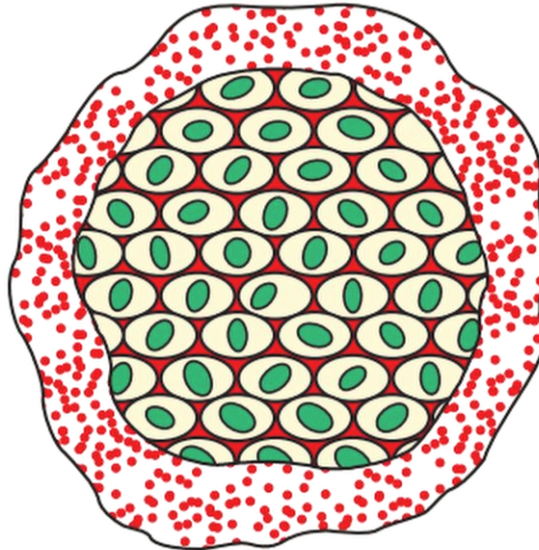
B. The leaf diagram includes xylem and phloem. Explain why both are needed by a photosynthesising leaf. (2)

11. Why is the pancreas described as a gland with a dual role? [2]

12. Explain why a reflex arc is useful when a person touches a hot object. [2]

13. Attempt either A or B. [3]

A. Study the multiple-fission figure. Explain how several daughter organisms are produced and how this differs from binary fission. (3)



OR

B. Why can the multiple-fission process shown rapidly increase population, and what must occur before daughter cells separate? (3)

14. Describe the main events after fertilisation in a human female up to implantation. [3]

15. A Tiwari Academy pond survey finds algae, larvae, small fish and fish-eating birds. A persistent pollutant enters the water. (a) Name a producer. (b) Name the top consumer. (c) Explain the risk to it despite low water concentration. [4]

16. Explain how carbon dioxide, water and light reach the site of photosynthesis. [5]

Attempt either A or B for the remaining 2 marks.

A. Why can photosynthesis and respiration both occur in daylight? (2)

OR

B. Why is oxygen release not a direct starch test? (2)

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. Combustion of methane is an example of a reaction that is: [1]

- (A) endothermic (B) always a double displacement
(C) a physical change only (D) exothermic

18. Which equation is balanced? [1]

- (A) $\text{H}_2 + 2\text{O}_2 \rightarrow \text{H}_2\text{O}$ (B) $2\text{H}_2 + 2\text{O}_2 \rightarrow \text{H}_2\text{O}$
(C) $2\text{H}_2 + \text{O}_2 \rightarrow 2\text{H}_2\text{O}$ (D) $\text{H}_2 + \text{O}_2 \rightarrow \text{H}_2\text{O}$

19. Chameleons contain crystals that reflect light and produce colour. Adjusting the spacing between these crystals, they can alter the wavelengths of light reflected, thus changing their skin colour. Based on the above information, we can infer that the change in colour by chameleons is a: [1]

- (A) chemical change because change in colour takes place.
(B) chemical change because wavelength of reflected light changes.
(C) physical change because the space between crystals is adjusted.
(D) physical change because light is reflected by crystals.

20. A solution turns red litmus blue. It is most likely: [1]

- (A) basic (B) acidic
(C) purely neutral (D) always a salt-free liquid

21. Which metal can be cut with a knife? [1]

- (A) Iron (B) Copper
(C) Silver (D) Sodium

22. Carbon generally forms covalent bonds because it: [1]

- (A) has a complete outer shell in its atom
(B) never bonds with itself
(C) shares electrons to complete its outer shell
(D) easily loses four electrons in water

23. A student must distinguish copper from iron without damaging either sample. Which test is useful? [1]

- (A) Convert both to oxides
(B) Compare their characteristic colours
(C) Dissolve both completely in acid
(D) Heat both until molten

24. Assertion (A): A precipitation reaction may also be a double displacement reaction.

Reason (R): Exchange of ions can form an insoluble salt. [1]

25. Attempt either A or B. [2]

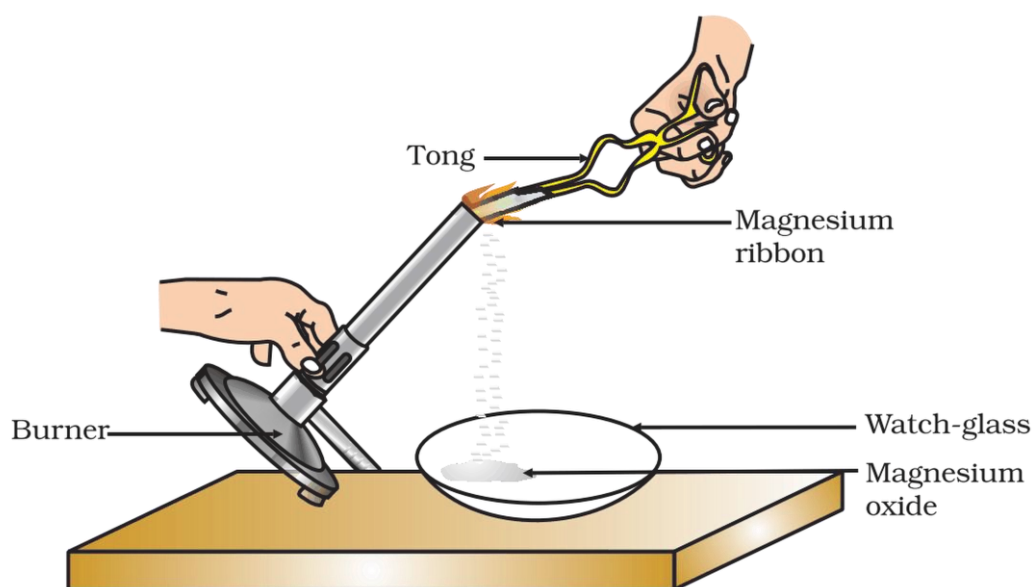
A. Why is respiration considered an exothermic reaction? (2)

OR

B. Why is a balanced equation necessary? State what it conserves. (2)

26. Balance the reaction of lead nitrate on heating and name all three products. [3]

27. Study the magnesium-burning apparatus. Explain why the ribbon is cleaned first, write the balanced reaction and classify it. [3]



28. A food manufacturer stores roasted nuts in sealed packets away from light. (a) Name the deterioration involving oxidation of fats. (b) State one sensory sign. [4]

Attempt either A or B for the remaining 2 marks.

A. Explain why an airtight packet and refrigeration can delay this change. (2)

OR

B. Explain the purpose of nitrogen flushing and adding an antioxidant. (2)

29. An organic liquid X has formula C_2H_5OH . Name X, write its reaction with sodium and identify the gas. [5]

Attempt either A or B for the remaining 2 marks.

A. Describe conversion of X to ethene with equation and conditions. (2)

OR

B. Describe complete combustion of X with an equation and energy change. (2)

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. The focal length of an ideal plane mirror is: [1]

- (A) 1 cm (B) negative 1 cm
(C) infinite (D) zero

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): A concave mirror can form both real and virtual images.
Reason (R): Its image depends on the object's position relative to the focus. [1]

33. Two thin lenses in contact have powers +12.5 D and –2.5 D. Find the power and focal length of the combination. [2]

34. Attempt either A or B. [2]

A. A charge of 240 C passes a point in a wire in 2 minutes. Calculate current and state the direction of conventional current relative to electrons. (2)

OR

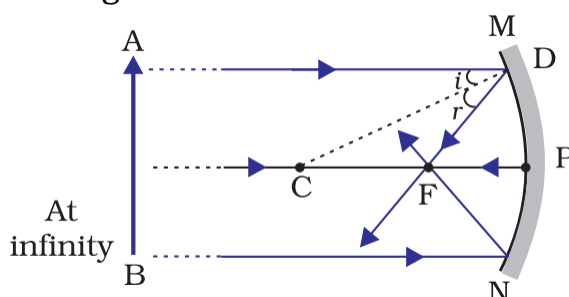
B. A current of 0.5 A flows for 4 minutes. Find charge transferred and the number of electrons, using $e = 1.6 \times 10^{-19}$ C. (2)

35. A 5 cm tall object is 30 cm in front of a convex lens of focal length 10 cm. Find image distance, height and nature. [3]

36. A. State the Right-Hand Thumb Rule and describe how it helps determine the direction of magnetic field around a current-carrying conductor.
B. Explain how the magnetic field changes with distance from the conductor. [3]

37. Attempt either A or B. [3]

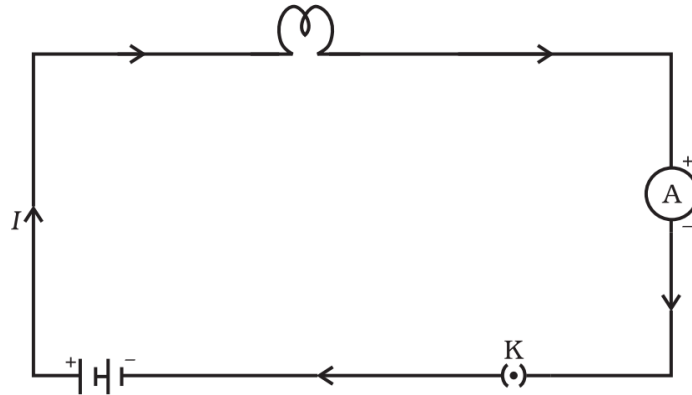
A. The mirror receives nearly parallel rays as shown. Its radius of curvature is 30 cm. Determine the focal length magnitude, image position and whether a distant bright object can form a screen image. (3)



OR

B. Explain why the parallel-ray mirror arrangement can concentrate sunlight and give two practical implications. (3)

38. The simple circuit shown is closed and its ammeter reads 0.30 A for 5 minutes. (a) Name the component that opens the circuit. (b) Calculate charge passing through the bulb. [4]



If the battery provides 3 V, find the energy supplied and bulb power, neglecting other resistance. (2)

39. A torch uses two 1.5 V cells in series and a bulb drawing 0.20 A. Find supply voltage, operating resistance and energy supplied in 10 minutes, neglecting cell resistance. [5]

Attempt either A or B for the remaining 2 marks.

A. A third identical cell is added. Assuming unchanged bulb resistance, find the new current and explain a practical limitation. (2)

OR

B. If one of the original two cells is reversed, calculate net voltage and current under the same resistance assumption. (2)