

SCIENCE
Sample Question Paper 13
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. Which situation best represents autotrophic nutrition? [1]**
(A) A green plant synthesises carbohydrates from inorganic substances
(B) A fungus absorbs digested food
(C) A tapeworm absorbs host nutrients
(D) An Amoeba engulfs a food particle
- 2. Which pathway correctly represents a simple reflex arc? [1]**
(A) Muscle → motor neuron → receptor → brain
(B) Receptor → muscle → sensory neuron → spinal cord
(C) Spinal cord → receptor → sensory neuron → muscle
(D) Receptor → sensory neuron → spinal cord → motor neuron → muscle
- 3. A fertilised human egg normally implants in the: [1]**
(A) vagina (B) urinary bladder
(C) uterine lining (D) ovary
- 4. The male reproductive hormone responsible for many changes at puberty is: [1]**
(A) progesterone only
(B) testosterone
(C) thyroxine
(D) insulin

5. The Vas deferens and the Oviduct are both targets for surgical contraception (Vasectomy and Tubectomy respectively). Analysing the process of reproduction, what common biological event is prevented by blocking both these structures? [1]

- (A) The production of gametes (sperm and egg).
- (B) The implantation of the fertilized egg into the uterine wall.
- (C) The successful meeting and fusion of the male and the female gametes.
- (D) The release of hormones - testosterone and estrogen.

6. The male gamete of an apple plant has seventeen chromosomes. What is the number of chromosomes in the female gamete and in the cells of the adult plant respectively? [1]

- (A) 17,17
- (B) 17,34
- (C) 34,34
- (D) 34,51

7. A flower with both stamens and pistil is: [1]

- (A) unisexual female
- (B) sterile in every case
- (C) bisexual
- (D) unisexual male

8. Assertion (A): The thyroid needs iodine to make thyroxine.

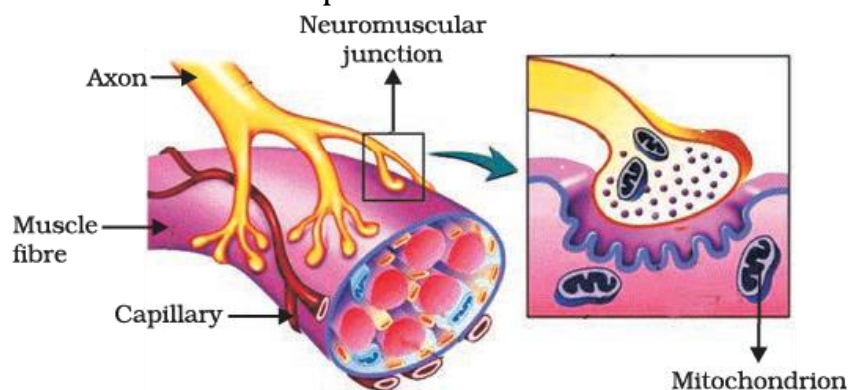
Reason (R): Iodine deficiency can cause enlargement of the thyroid. [1]

9. Assertion (A): Ozone at ground level and ozone high in the atmosphere have identical effects on humans.

Reason (R): Upper atmospheric ozone reduces harmful ultraviolet exposure. [1]

10. Attempt either A or B. [2]

A. The figure shows a nerve ending at a muscle fibre. Explain the role of the released chemical and the final muscular response.



OR

B. Why is a neuromuscular junction necessary even though an impulse travels electrically along the neuron?

11. What changes occur in the pupil on moving from dim to bright light, and why? [2]

12. Attempt either A or B. [2]

A. Why are blood cells and large proteins normally absent from the initial filtrate in Bowman's capsule?

OR

B. Why can useful substances appear in glomerular filtrate but not normally in final urine in large amounts?

13. Attempt either A or B. [3]

A. A student claims all differences between siblings result only from food and exercise. Evaluate the claim.

OR

B. Why are a scar and natural eye colour not equally likely to be inherited?

14. Compare arteries, veins and capillaries using one structural feature of each linked to its function. [3]

15. In a Tiwari Academy flower experiment, pollen from one plant is placed on another compatible plant's stigma. (a) Name the pollination type. (b) What grows from pollen? (c) Explain zygote formation and fruit origin. [4]

16. Explain accumulation of persistent chemicals at high trophic levels. [5]
Suggest two preventive measures.

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. Which non-metal is liquid near room temperature? [1]

- | | |
|----------------|-------------|
| (A) Bromine | (B) Sulphur |
| (C) Phosphorus | (D) Carbon |

18. Which is an example of a thermal decomposition reaction? [1]

- | | |
|---|--|
| (A) $C + O_2 \rightarrow CO_2$ | (B) $NaOH + HCl \rightarrow NaCl + H_2O$ |
| (C) $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$ | (D) $CaCO_3 \rightarrow CaO + CO_2$ on heating |

19. Electrical wires made of aluminum [1]

- (A) corrode easily as aluminium is a very reactive metal.
(B) corrode easily because porous flaky aluminium oxide is formed.
(C) do not corrode easily as aluminium oxide forms a protective layer.
(D) do not corrode easily as aluminium is less reactive than metals like sodium, magnesium and zinc.

20. Which acid occurs naturally in citrus fruits? [1]

- (A) Nitric acid (B) Citric acid
(C) Sulphuric acid (D) Hydrochloric acid

21. A metal that reacts vigorously with cold water is: [1]

- (A) calcium (B) copper
(C) silver (D) gold

22. Which molecule has only single covalent bonds between its carbon atoms? [1]

- (A) Propene (B) Propyne
(C) Ethyne (D) Propane

23. Which substance is commonly used as an oxidising agent for ethanol in school chemistry? [1]

- (A) Calcium carbonate (B) Sodium hydrogencarbonate
(C) Alkaline potassium permanganate (D) Sodium chloride

24. Assertion (A): Copper can displace magnesium from magnesium sulphate solution.

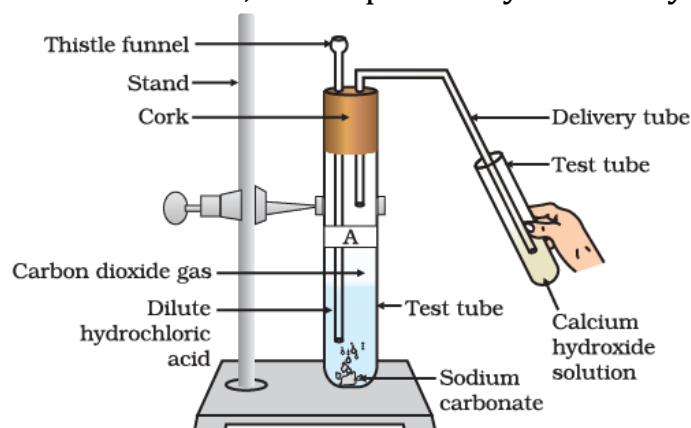
Reason (R): Magnesium is more reactive than copper. [1]

25. What is an amalgam? Name the usual components of solder. [2]

26. Explain why iron is galvanised, why copper is used for wires and why aluminium is used for cooking vessels. [3]

27. Attempt either A or B. [3]

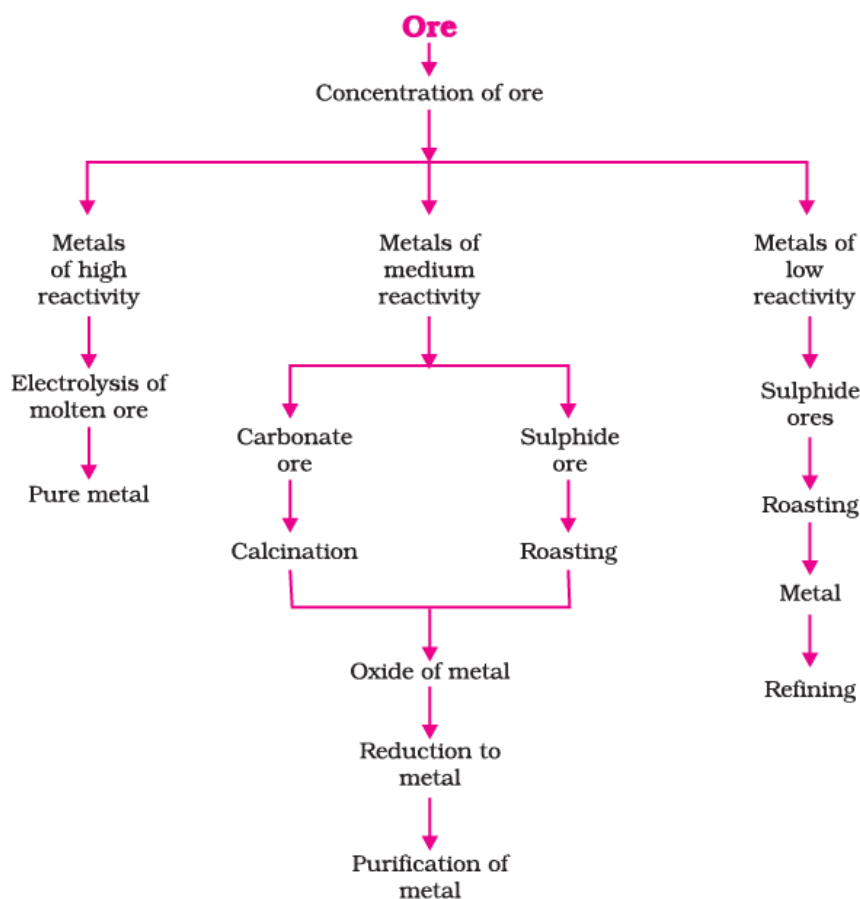
A. The carbonate–acid apparatus passes gas into limewater. Give the equations for gas generation and initial milky, and explain why a delivery tube is used.



OR

B. Predict and explain what happens if the gas from the carbonate reaction is passed through limewater for a long time.

28. A metallurgist uses the extraction routes shown. (a) Name the process for heating a sulphide in air. (b) Name the process for heating a carbonate with little air. [4]



Attempt either A or B for the remaining 2 marks.

A. Explain why both routes often first produce an oxide and why highly reactive metals need another route. (2)

OR

B. Write equations converting ZnS and ZnCO_3 to ZnO . (2)

29. Explain why aluminium's apparent resistance to corrosion does not place it below copper in reactivity. [5]

Attempt either A or B for the remaining 2 marks.

A. Explain anodising and one benefit. (2)

OR

B. Explain why aluminium can reduce iron oxide in the thermit reaction. (2)

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. The SI unit of electric current is: [1]

(A) ohm

(B) volt

(C) watt

(D) ampere

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): The pupil controls the eye lens's chemical composition.

Reason (R): The iris regulates the size of the pupil.

[1]

33. How is an ammeter connected and why must its resistance be very low?

[2]

34. Attempt either A or B.

[2]

A. A $5\ \Omega$ resistor carries 2 A for 3 minutes. Calculate the heat produced.

OR

B. With current fixed, what happens to heating if resistance is doubled and time is halved?

35. Derive Joule's heating expression starting with electrical work.

[3]

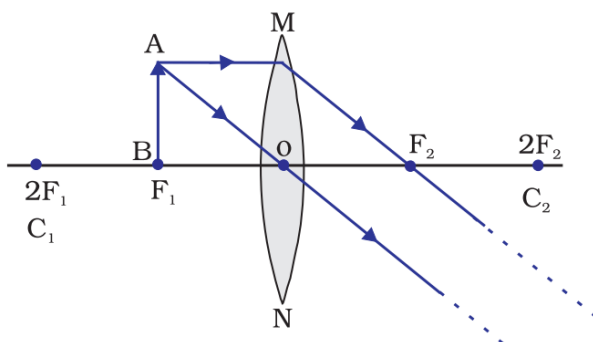
36. A. State the Right-Hand Thumb Rule and describe how it helps determine the direction of magnetic field around a current-carrying conductor.

B. Explain how the magnetic field changes with distance from the conductor.

[3]

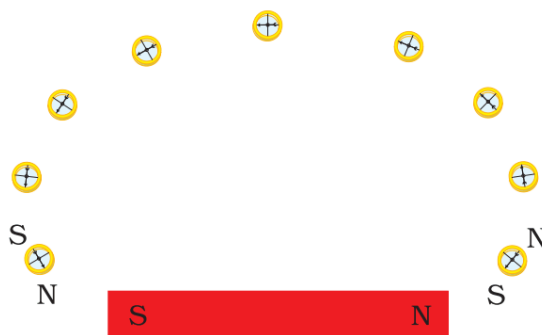
37. The object lies at the convex lens's focus as shown. Explain the outgoing rays, image distance and one use of this arrangement.

[3]



38. The figure shows a compass moved step by step around a bar magnet. (a) Which compass end indicates the field direction? (b) Why mark both ends at each position?

[4]



Attempt either A or B for the remaining 2 marks.

A. Describe how successive positions trace a field line. (2)

OR

B. Explain why a freely suspended compass near the magnet need not point geographic north. (2)

39. A convex rear-view mirror has radius 60 cm and shows a vehicle 90 cm in front. Find focal length, image distance and magnification. [5]

Attempt either A or B for the remaining 2 marks.

A. Explain why the image may mislead a driver about distance and why the mirror is still useful. (2)

OR

B. What happens to image position and size as the vehicle moves very far away? (2)