

SCIENCE
Sample Question Paper 15
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 substance supplies nitrogen for synthesis of plant proteins? [1]**
(A) Starch absorbed from sunlight
(B) Carbon dioxide absorbed by roots only
(C) Nitrates absorbed from soil
(D) Oxygen absorbed through stomata
- 2. Drooping of a sensitive plant's leaves soon after touch mainly results from: [1]**
(A) photosynthesis stopping permanently
(B) changes in water content of cells
(C) rapid increase in stem length
(D) formation of new roots
- 3. Mendel selected which plant for his inheritance experiments? [1]**
(A) Garden pea (B) Mango
(C) Wheat (D) Rose
- 4. Which structure supplies nutrients to a developing human embryo? [1]**
(A) Ureter
(B) Prostate gland
(C) Vas deferens
(D) Placenta

5. 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

6. 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.

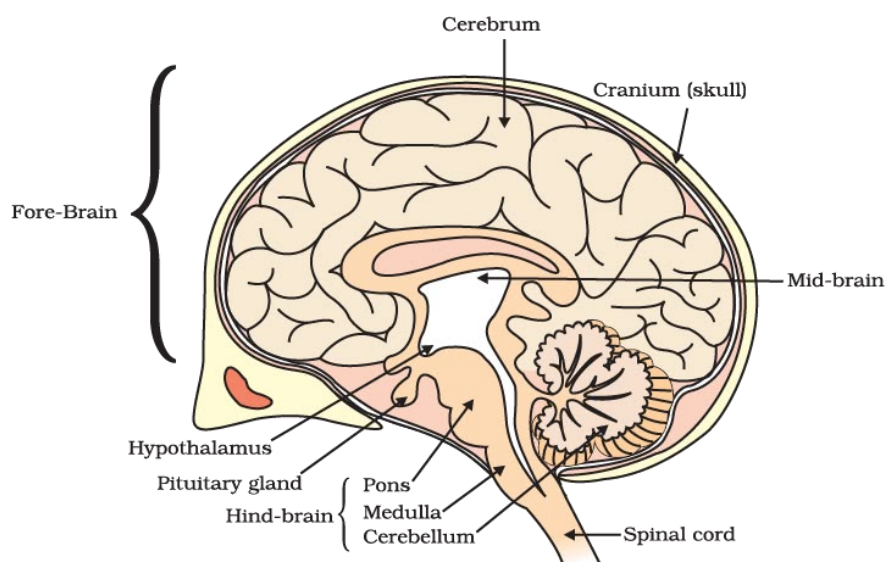
7. Why is DNA copying not perfectly identical in every reproductive event? [1]

- (A) Small variations can arise during copying
(B) DNA is absent in offspring
(C) All parents have identical DNA
(D) Only temperature determines DNA sequence

8. Assertion (A): Growth responses in plants are always towards the stimulus.
Reason (R): Shoots normally grow away from gravity. [1]

9. Assertion (A): A recessive allele disappears permanently in the F_1 generation.
Reason (R): It may reappear phenotypically in F_2 after segregation. [1]

10. A cyclist maintains balance while also thinking about the route. Use the brain diagram to identify the regions chiefly responsible for these two tasks. [2]



11. What is tissue culture? Give one practical advantage. [2]

12. Attempt either A or B. [2]

A. Why do natural ecosystems depend on a continuing input of solar energy? (2)

OR

B. What happens to energy used by organisms for movement and other life processes? (2)

13. Attempt either A or B. [3]

A. A garden's insects are greatly reduced by pesticide use. Predict two effects on the food web and one risk from a persistent pesticide. (3)

OR

B. Why can killing an insect affect species that never eat it directly? (3)

14. Describe three changes caused by adrenaline that prepare a person for an emergency. [3]

15. A Tiwari Academy worksheet describes a runner with increased heart and breathing rates. (a) Why is more oxygen needed? (b) What carries most oxygen? (c) Explain how the two rate changes work together. [4]

16. Explain independent inheritance using RrYy peas. [5]

Attempt either A or B for the remaining 2 marks.

A. Give the F₂ phenotype ratio and its assumptions. (2)

OR

B. Why does this increase diversity? (2)

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. Which is used as a common insulating covering on electrical wires? [1]

- (A) Aluminium
- (B) Brass
- (C) PVC
- (D) Copper

18. A substance loses oxygen in a reaction. It is said to be: [1]

- (A) neutralised in every case
- (B) reduced
- (C) oxidised
- (D) precipitated

19. Manjeet wants to wash clothes, but the water available is hard. He compares the action of soap and detergent in hard water, to decide which one to use for washing his clothes. He observes:

- Soap forms scum in hard water.
- Detergent produces lather easily in hard water.

Which of the following inferences is correct? [1]

- (A) Ca^{2+} and Mg^{2+} ions react with soap, forming insoluble compounds, whereas detergents do not form such insoluble salts.
- (B) Soap is acidic, and detergents are basic.
- (C) Soap react with Na^+ ions in hard water to form scum while detergents do not react with Na^+ ions.
- (D) Detergents form lather easily because they are ionic compounds and react with Ca^{2+} and Mg^{2+} ions while soaps do not react with hard water.

20. A salt of a strong acid and a weak base is commonly: [1]

- (A) always strongly basic (B) always insoluble
- (C) free of ions in water (D) acidic in aqueous solution

21. Which metal occurs in native form because of very low reactivity? [1]

- (A) Calcium (B) Magnesium
- (C) Gold (D) Sodium

22. A hydrocarbon burning with insufficient oxygen commonly produces: [1]

- (A) a blue precipitate (B) a sooty flame
- (C) only nitrogen gas (D) sodium chloride crystals

23. Which carbon compound is used in alcoholic drinks and as a solvent? [1]

- (A) Ethanol (B) Ethanoic acid
- (C) Methanal (D) Sodium ethanoate

24. Assertion (A): Roasting is generally used for sulphide ores.

Reason (R): Heating them in excess air converts sulphides to oxides. [1]

25. Attempt either A or B. [2]

A. Why cannot highly reactive metals such as sodium be extracted from their oxides using carbon? (2)

OR

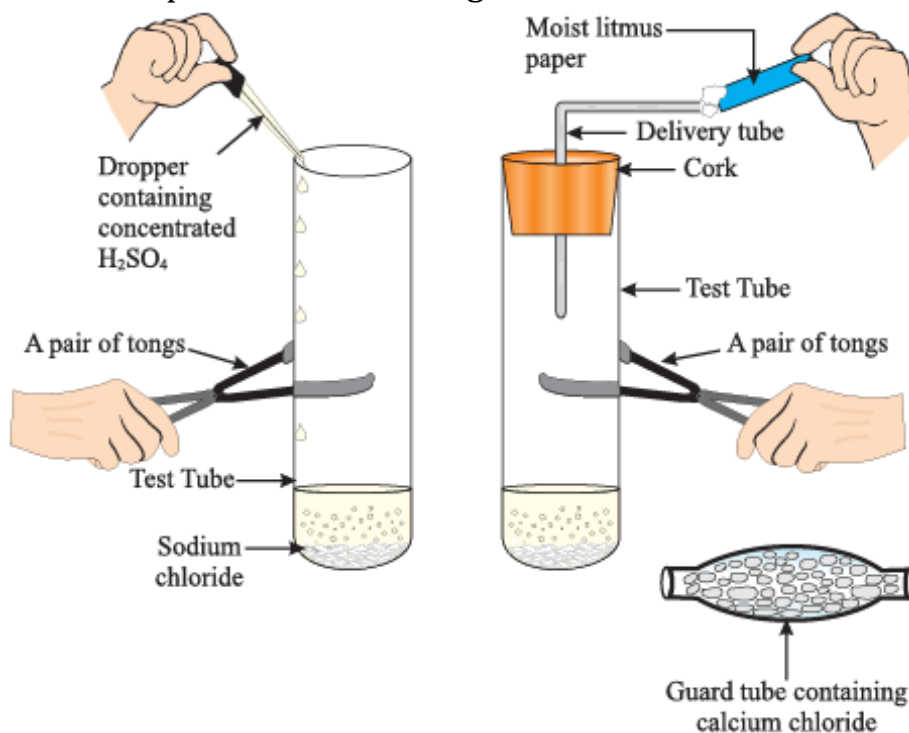
B. Why do ionic compounds often dissolve in water but not in kerosene? (2)

26. Name the functional groups in methanoic acid, methanal and bromoethane. [3]

27. Attempt either A or B.

[3]

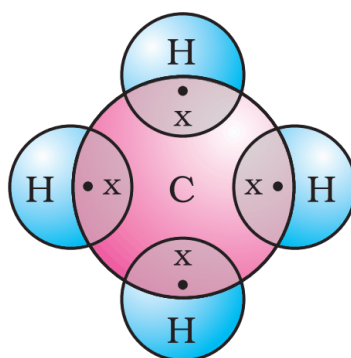
A. In the HCl preparation diagram, explain the role of calcium chloride, the need for moist litmus and the expected litmus change. (3)



OR

B. Explain why acidity is a property of the HCl–water system rather than dry HCl alone in the litmus test. (2)

28. The methane model shows shared electron pairs. (a) How many covalent bonds surround carbon? (b) How many electrons are in each shared pair? [4]



Explain how carbon and hydrogen each achieve a stable shell arrangement. (2)

29. Explain how neutralisation applies to stomach acidity, insect stings and acidic soil. [5]

Attempt either A or B for the remaining 2 marks.

A. Why is a strong laboratory base unsuitable as an ordinary antacid? (2)

OR

B. Explain why neutralising an acid does not remove every ion from the mixture. (2)

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. The opposition offered by a conductor to electric current is its: [1]

- (A) potential energy (B) resistance
(C) charge (D) power

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): Red light is generally scattered less than blue light by very small particles.

Reason (R): Red light has a longer wavelength than blue light. [1]

33. Define electrical power and state its SI unit. [2]

34. Attempt either A or B. [2]

A. A horizontal wire carries current northwards in a magnetic field directed vertically downwards. Find the force direction and name the rule used. (2)

OR

B. A proton travels east through a magnetic field directed north. Predict its force direction. (2)

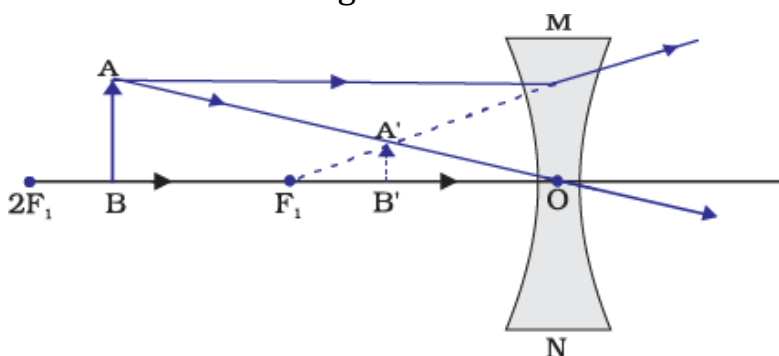
35. State how the heat produced in a resistor depends on current, resistance and time. [3]

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]

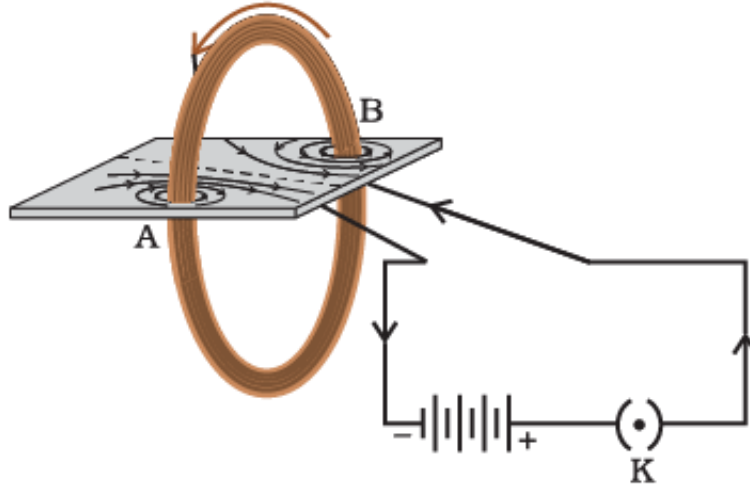
A. The concave lens has $f = -12$ cm and $u = -24$ cm. Calculate image distance and magnification and relate them to the figure. (3)



OR

B. Why can a concave lens not form a real image of an ordinary real object placed in front of it? Relate your answer to the diagram. (3)

38. Current passes through the circular coil shown. (a) Describe field lines near a small section of wire. (b) Describe them near the centre. [4]



Attempt either A or B for the remaining 2 marks.

A. Explain how fields from different parts combine and what ten turns would do at fixed current and radius. (2)

OR

B. Predict the effect of reversing current and of increasing the coil's radius at fixed current. (2)

39. Light travels at 2.4×10^8 m/s in medium A and 2.0×10^8 m/s in medium B. Find both absolute indices and B's index relative to A. [5]

Predict bending from A to B at oblique incidence and explain whether frequency must change.