

SCIENCE
Sample Question Paper 11
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 event is directly responsible for opening a heart valve? [1]**
(A) Secretion of bile
(B) Contraction of a bone
(C) A pressure difference across the valve
(D) An electrical impulse from the kidney
- 2. Iodine is required by the body mainly for producing: [1]**
(A) growth hormone
(B) thyroxine
(C) insulin
(D) oestrogen
- 3. The blood component that transports most oxygen is: [1]**
(A) haemoglobin in red blood cells (B) platelets
(C) plasma urea (D) lymph fat droplets
- 4. Mendel obtained all round seeds in F_1 after crossing true-breeding round and wrinkled peas. This indicates that roundness is: [1]**
(A) always environmentally acquired
(B) absent from wrinkled parents' DNA entirely
(C) a sex-linked human trait
(D) dominant over wrinkledness

5. 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

6. A fish living in a pond ecosystem feeds on small aquatic insects (larvae). These insect larvae, in turn, feed on green algae and small photosynthetic bacteria. In this specific food chain, what is the trophic level classification of fish? [1]

(A) Producer

(B) Primary Consumer

(C) Secondary Consumer

(D) Tertiary Consumer

7. Which practice most directly reduces non-biodegradable waste generation? [1]

(A) Reusing a durable shopping bag

(B) Burning mixed plastic waste

(C) Discarding a bottle after each use

(D) Mixing all waste with kitchen scraps

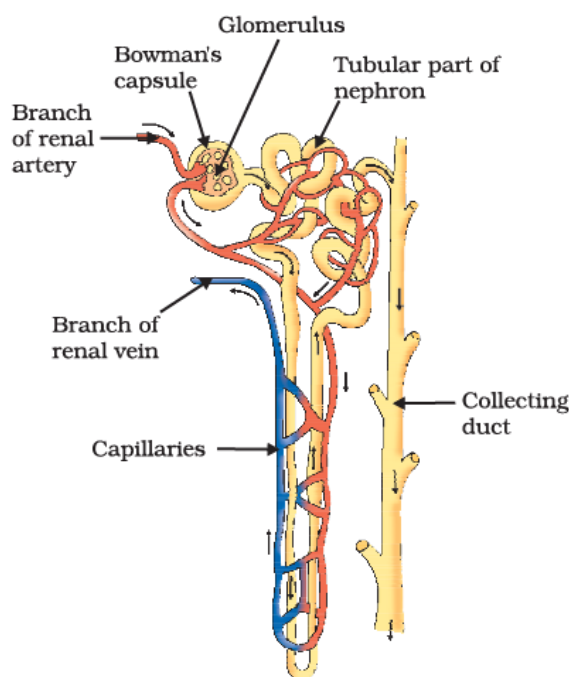
8. Assertion (A): The cerebellum controls precision of voluntary movements.

Reason (R): It coordinates muscular activity and body balance. [1]

9. Assertion (A): Every pair of contrasting traits must blend in the F_1 generation.

Reason (R): A dominant trait can be expressed in a heterozygote. [1]

10. The nephron is surrounded by capillaries. Explain why this arrangement is essential after initial filtration. [2]



11. What is placenta? State one of its functions. [2]

12. Attempt either A or B. [2]

A. What is the difference between breathing and cellular respiration?

OR

B. How can respiration continue in germinating seeds that have no green leaves?

13. Attempt either A or B. [3]

A. Explain how gamete formation prevents chromosome number doubling in every generation. (3)

OR

B. Explain how fertilisation restores the normal body-cell chromosome number. (3)

14. Explain how decomposers support an ecosystem and predict a consequence of their removal. [3]

15. A Tiwari Academy worksheet compares barrier and hormonal contraception. (a) Give a barrier example. (b) Which also reduces STI transmission? (c) Explain how each prevents pregnancy. [4]

16. Explain feedback control using insulin. [5]

Attempt either A or B for the remaining 2 marks.

A. Why must hormone secretion be regulated? (2)

OR

B. Compare insulin distribution with a motor impulse. (2)

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. Which compound is not ionic? [1]

(A) Magnesium chloride

(B) Calcium oxide

(C) Carbon tetrachloride

(D) Sodium chloride

18. Which coefficient balances oxygen in $\text{CH}_4 + x\text{O}_2 \rightarrow \text{CO}_2 + 2\text{H}_2\text{O}$? [1]

(A) 4

(B) 2

(C) 1

(D) 3

19. A solution made by dissolving hydrogen chloride in water contains: [1]

(A) only neutral HCl molecules

(B) free hydrogen atoms only

(C) only hydroxide ions

(D) hydronium ions

20. 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.

21. Which metal is extracted chiefly by electrolytic reduction of its molten compound? [1]

(A) Mercury from cinnabar only

(B) Silver from native deposits only

(C) Sodium

(D) Copper from sulphide only

22. Which compound has the formula C_4H_{10} ? [1]

(A) Propane

(B) Butane

(C) Butene

(D) Butyne

23. Which pair can undergo a displacement reaction in aqueous solution? [1]

(A) Zinc and copper sulphate

(B) Copper and magnesium sulphate

(C) Silver and zinc sulphate

(D) Gold and sodium chloride

24. Assertion (A): Water of crystallisation can be removed by heating some hydrated salts.

Reason (R): Hydrated salts contain a fixed number of water molecules in their formula unit. [1]

25. Attempt either A or B. [2]

A. Why does limewater first turn milky and then clear when excess carbon dioxide is passed through it? (2)

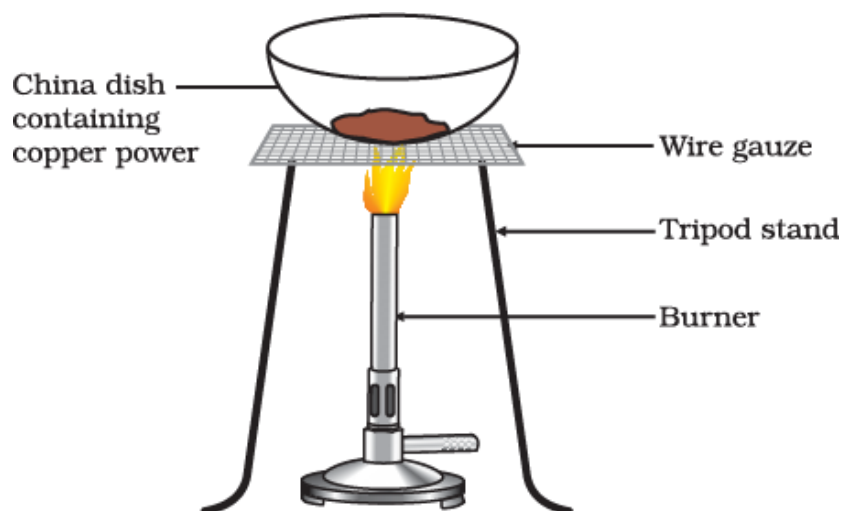
OR

B. State the colour changes of blue litmus in acid and red litmus in alkali. (2)

26. Write the equations for obtaining zinc oxide from zinc sulphide and zinc carbonate, naming the processes. [3]

27. Attempt either A or B. [3]

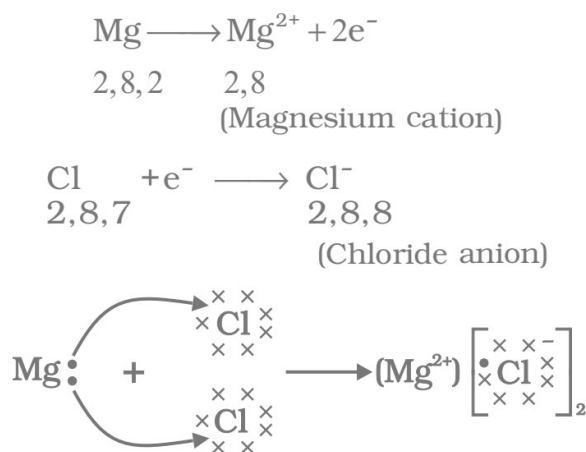
A. Copper powder is heated in the apparatus shown. Explain the colour change, write the equation and describe how the product can be reduced. (3)



OR

B. Explain how the copper experiment can demonstrate a cycle of oxidation followed by reduction. (3)

28. The diagram shows ionic formation from magnesium and chlorine. (a) How many electrons does Mg lose? (b) How many chlorine atoms receive them? [4]



Derive the formula from charges and explain why electron sharing is not the main bonding description here. (2)

29. Compare metallic and covalent substances using copper and methane: bonding-related charge carriers, conductivity and physical state near room temperature. [5]

Attempt either A or B for the remaining 2 marks.

A. Why can graphite conduct despite being a non-metal? (2)

OR

B. Why does melting an ionic compound differ electrically from melting a typical molecular compound? [2]

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. At noon the Sun appears nearly white mainly because: [1]

- (A) all blue light is absorbed by the Moon
- (B) its light travels a shorter atmospheric path and is less scattered
- (C) all colours are scattered away
- (D) only red light reaches Earth

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 power of a diverging lens is negative.
Reason (R): Its focal length is negative under the Cartesian convention. [1]

33. Define atmospheric refraction and state its cause. [2]

34. Attempt either A or B. [2]

A. Two identical resistors are connected first in series and then in parallel. Compare the two equivalent resistances. (2)

OR

B. A $12\ \Omega$ resistor is connected in parallel with another $12\ \Omega$ resistor. Find total resistance and state whether this exceeds either branch. (2)

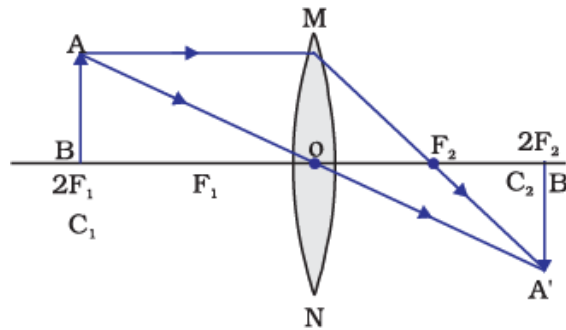
35. State the functions of the cornea, iris and crystalline lens. [3]

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]

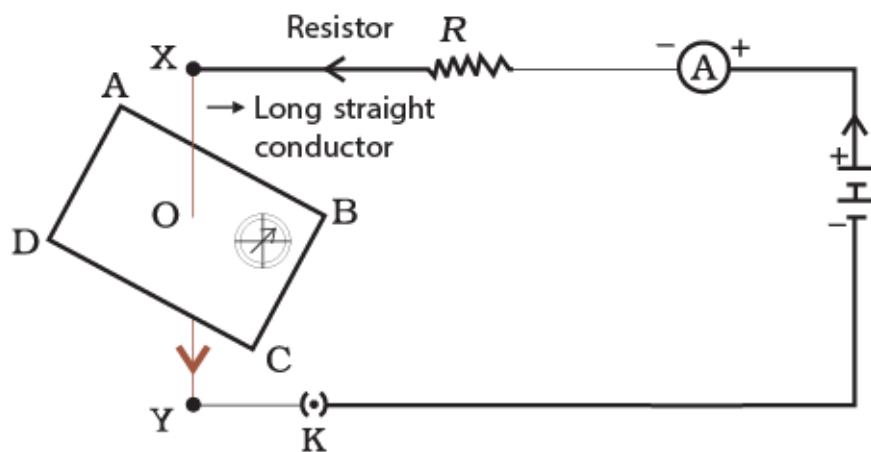
A. The lens diagram places the object at $2F_1$. If $f = +15\text{ cm}$, calculate v and magnification and state where a screen should be placed. (3)



OR

B. If the lens's upper half is masked in the shown 2F arrangement, predict image position, extent and brightness. (3)

38. The compass near the wire in the illustrated circuit deflects when the key is closed. (a) What does this show? (b) What happens when current stops? [4]



Attempt either A or B for the remaining 2 marks.

A. Predict the effects of reversing current and increasing current magnitude. (2)

OR

B. Why should the compass be kept close to the wire, and why must other magnets be removed? (2)

39. A convex lens forms a real image at 60 cm of an object 30 cm in front. Find focal length, power and magnification. [5]

Where should the object be placed for a same-size real image, and where will that image form? (2)