

Model Question Paper 2
Half-Yearly Examination 2026-27
SCIENCE

Time Allowed: 3 Hours

Maximum Marks: 80

General Instructions:

1. This question paper has 5 sections: A, B, C, D and E.
2. Section A has 20 objective type questions carrying 1 mark each.
3. Section B has 6 questions carrying 2 marks each. Answers to these should not exceed 40-50 words each.
4. Section C has 7 questions carrying 3 marks each. Answers to these should not exceed 60-80 words each.
5. Section D has 3 questions carrying 5 marks each. Answers to these should not exceed 120 words each.
6. Section E has 3 source/case-based questions carrying 4 marks each with sub-parts.
7. There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the choices in such questions.
8. Wherever necessary, neat and labelled diagrams should be drawn.

SECTION A

Question numbers 1 to 20 carry 1 mark each. Choose the most appropriate answer.

1. Iron sheets used to make buckets and pipes are often coated with a thin layer of zinc to prevent rusting. This process is called: [1]
(a) Galvanisation
(b) Electroplating with copper
(c) Alloying
(d) Annealing
2. On heating lead nitrate crystals strongly in a test tube, brown fumes are given off and a yellow residue remains. This is an example of a: [1]
(a) Combination reaction
(b) Thermal decomposition reaction
(c) Displacement reaction
(d) Neutralisation reaction
3. Plaster of Paris, used by doctors to support a fractured bone, is obtained by heating gypsum to a controlled temperature. Its chemical formula is: [1]
(a) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
(b) $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$
(c) CaCO_3
(d) $\text{Ca}(\text{OH})_2$
4. When Plaster of Paris is mixed with water and applied around a fractured limb, it is useful because it: [1]
(a) Remains a soft paste indefinitely
(b) Sets into a hard, solid mass within minutes
(c) Dissolves the bone tissue
(d) Reacts with the bone to form gypsum
5. Aircraft bodies and cooking utensils are commonly made of aluminium mainly because it is: [1]
(a) Light in weight and a good conductor of heat

- (b) Extremely hard and brittle
- (c) Completely non-reactive with all acids
- (d) Strongly magnetic

6. Iron articles are galvanised (coated with a layer of zinc). Even if this zinc coating gets scratched, the iron underneath continues to be protected from rusting because: [1]

- (a) Zinc is more reactive than iron and corrodes first, protecting the iron
- (b) Zinc is completely unreactive
- (c) The scratch seals itself automatically
- (d) Zinc conducts electricity away from the iron

7. A certain metal does not react with cold water or steam, but reacts vigorously with dilute HCl and dilute H_2SO_4 , evolving hydrogen gas; sheets of this metal are used to galvanise iron. This metal is: [1]

- (a) Sodium
- (b) Zinc
- (c) Copper
- (d) Gold

8. The organ that continuously pumps blood to all parts of the human body is the: [1]

- (a) Lungs
- (b) Heart
- (c) Kidney
- (d) Liver

9. After a meal, digested food moves into a long, coiled tube where most of the nutrients are absorbed into the blood. This tube is the: [1]

- (a) Oesophagus
- (b) Stomach
- (c) Small intestine
- (d) Large intestine

10. A completely submerged aquatic plant does not have specialised breathing organs, yet respire efficiently. This is mainly because: [1]

- (a) It has gills like fish
- (b) Its large surface area in direct contact with water allows sufficient gaseous exchange by diffusion
- (c) It does not need oxygen
- (d) It stores oxygen in special sacs

11. The tiny gap between two adjacent neurons across which a nerve impulse passes chemically is called a: [1]

- (a) Synapse
- (b) Dendrite
- (c) Axon
- (d) Nucleus

12. A potted plant kept near a window is seen to slowly bend its shoot towards the incoming sunlight over several days. This directional growth movement is called: [1]

- (a) Geotropism
- (b) Phototropism

- (c) Hydrotropism
- (d) Thigmotropism

13. The bending of a shoot towards light occurs because a plant hormone accumulates more on the shaded side, making those cells elongate faster than cells on the lit side. This hormone is: [1]

- (a) Cytokinin
- (b) Auxin
- (c) Gibberellin
- (d) Absciscic acid

14. The SI unit of electrical resistance is the: [1]

- (a) Ampere
- (b) Volt
- (c) Ohm
- (d) Watt

15. As more and more electrical appliances are switched on in parallel in a household circuit, the total (equivalent) resistance of the circuit: [1]

- (a) Increases
- (b) Decreases
- (c) Remains unchanged
- (d) Becomes infinite

16. A copper wire of resistance $10\ \Omega$ is stretched uniformly until its length becomes double, its volume remaining unchanged. Its new resistance becomes: [1]

- (a) $5\ \Omega$
- (b) $10\ \Omega$
- (c) $20\ \Omega$
- (d) $40\ \Omega$

17. A concave mirror forms a virtual, erect and magnified image of an object when the object is placed: [1]

- (a) At the centre of curvature
- (b) Beyond the centre of curvature
- (c) Between the pole and the principal focus
- (d) Exactly at the principal focus

18. For a convex lens to form a real, diminished image of an object, the object must be placed: [1]

- (a) Between the optical centre and the focus
- (b) Exactly at the focus
- (c) Beyond twice the focal length (2F)
- (d) Exactly at 2F, giving an image of the same size

19. This question consists of two statements — Assertion (A) and Reason (R). Choose the correct option: [1]

Assertion (A): A convex lens can be used as a simple magnifying glass.

Reason (R): When an object is placed between the optical centre and the principal focus of a convex lens, the lens forms a virtual, erect and magnified image of the object.

- (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

20. This question consists of two statements — Assertion (A) and Reason (R). Choose the correct option: [1]

Assertion (A): The power of a convex lens is taken as positive, while the power of a concave lens is taken as negative.

Reason (R): Power of a lens is the reciprocal of its focal length (in metres); by the sign convention used, the focal length of a convex lens is positive and that of a concave lens is negative.

- (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 B

Question numbers 21 to 26 carry 2 marks each.

21. A magnesium ribbon is cleaned with sandpaper and burnt in air; it burns with a dazzling white flame to form a white powder. Write the balanced chemical equation for this reaction and name its type. [2]

22. Explain why a solution of copper sulphate should never be stored in an iron vessel. [2]

23. A student dips a strip of zinc into blue copper sulphate solution and separately dips a strip of silver into another sample of the same solution. She observes that the blue colour fades in the first case but not in the second. Explain both observations. [2]

24. State two differences between the blood carried by arteries and the blood carried by veins in the human body. [2]

25. In a potted plant, the roots always grow downward into the soil while the shoot grows upward, even if the pot is placed on its side. Name this tropic movement and explain briefly why roots and shoots respond oppositely. [2]

26. A 100 W bulb and a 60 W bulb, both rated for 220 V, are connected in series to the mains supply. Which bulb will glow brighter, and why? [2]

SECTION C

Question numbers 27 to 33 carry 3 marks each.

27. White silver chloride, when kept exposed to sunlight, gradually turns grey as it decomposes into silver and chlorine. (a) Write the balanced chemical equation. (b) Name the type of reaction. (c) State why this property of silver salts is useful in black-and-white photography. [3]

28. An LPG stove burns with a clean blue flame when the air supply is sufficient but produces a yellow, sooty flame with black smoke when the air holes are partly blocked. Explain this observation in terms of complete and incomplete combustion, and state one harmful effect of incomplete combustion. [3]

29. Write the chemical formula and one use of each of the following: (a) Bleaching powder, (b) Baking soda, (c) Washing soda. [3]

30. Fish and other aquatic animals generally have a much faster breathing rate (opening and closing of the mouth/gill covers) compared to land animals with lungs. Explain why, in terms of the amount of oxygen available for respiration. [3]

31. With reference to plant hormones: (a) How does auxin cause a shoot to bend towards light? (b) Name the hormone responsible for the ripening of fruits, and (c) name a hormone that promotes cell division in plants. [3]

32. A house has three bulbs of ratings 40 W, 60 W and 100 W, all designed for 220 V, that need to work normally and independently. Should they be connected in series or in parallel? Justify your answer with one reason, and state one advantage of the arrangement you chose. [3]

33. A pencil held partly immersed in a glass of water, when viewed from the side, appears bent at the water surface, and also appears displaced from its actual position. Name and explain this phenomenon, and give one more everyday example of the same effect. [3]

SECTION D

Question numbers 34 to 36 carry 5 marks each.

34. Explain what rusting of iron is, including the chemical substance formed. Describe three different practical methods, with reasons, that are used to prevent or reduce the rusting of iron articles in daily life. [5]

OR

A student wants to compare the reactivity of four metals — aluminium, zinc, iron and copper — by dipping strips of each metal into salt solutions of the other three metals. Describe briefly what she would observe, and use your reasoning to arrange the four metals in decreasing order of reactivity.

35. Describe the pathway of air from the nostrils to the alveoli in the human respiratory system, and explain the mechanism of breathing (inspiration and expiration) in terms of the movement of the diaphragm and rib cage. [5]

OR

Explain how water and minerals are transported upward in the xylem of a tall tree, and how food manufactured in the leaves is transported through the phloem to other parts of the plant. Why can transport in phloem occur in both directions, unlike the largely one-directional flow in xylem?

36. With the help of a neat, labelled ray diagram, show how a convex lens forms a real, diminished image of an object placed beyond $2F$. Define the power of a lens, and calculate the power of a convex lens of focal length 25 cm. [5]

OR

State the laws of refraction of light. A ray of light travels from air into a rectangular glass slab and emerges from the opposite face into air again. With the help of a ray diagram, explain the lateral displacement of the emergent ray, and give one everyday situation in which refraction of light can be observed.

SECTION E

Question numbers 37 to 39 are source/case-based questions carrying 4 marks each.

Case Study 1 — Question 37 [4 Marks]

Rina noticed that iron railings near her family's house by the seaside get rusted and weak within a couple of years, while similar railings further inland stay in good condition for much longer. She also noticed that a section of

railing which had been freshly painted stayed shiny and rust-free even near the sea. Her science teacher explained that rusting requires both oxygen and moisture, and that salty, humid sea air speeds up the process considerably.

- (i) Write the chemical name and formula of rust. [1]
- (ii) Name the two substances that must both be present for iron to rust. [1]
- (iii) Why does rusting occur faster in railings near the seaside than those further inland? [1]
- (iv) How does painting the railing help protect it from rusting? [1]

OR Name one other method (besides painting) that could be used to protect the iron railing from rusting.

Case Study 2 — Question 38 [4 Marks]

Ramesh, aged 14, is noticeably shorter than most of his classmates of the same age. On medical examination, doctors found that a small gland at the base of his brain was not producing enough of a hormone required for normal body growth. With regular hormone therapy prescribed by an endocrinologist, his growth gradually improved over the next couple of years.

- (i) Name the gland at the base of the brain that secretes growth hormone. [1]
- (ii) What term is used for the condition caused by a deficiency of growth hormone during childhood? [1]
- (iii) Apart from growth hormone, name one other hormone secreted by the same gland. [1]
- (iv) Why is it important for hormones to be secreted in precise, carefully regulated amounts by the body? [1]

OR Name the endocrine gland present in the neck region and one hormone it secretes.

Case Study 3 — Question 39 [4 Marks]

As part of a school project, a student connects a $5\ \Omega$ resistor and a $10\ \Omega$ resistor in series with a $3\ \text{V}$ battery and an ammeter, and notes the current. She then reconnects the same two resistors in parallel across the same battery and notes the current again. Her teacher points out that this is exactly why household wiring always connects appliances in parallel rather than in series.

- (i) State one reason why household appliances are always connected in parallel rather than in series. [1]
- (ii) Calculate the total resistance and the current drawn when the $5\ \Omega$ and $10\ \Omega$ resistors are connected in series across the $3\ \text{V}$ battery. [1]
- (iii) Calculate the total resistance and the current drawn when the same two resistors are connected in parallel across the $3\ \text{V}$ battery. [1]
- (iv) Why is the current drawn from the battery greater when the resistors are connected in parallel than in series? [1]

OR State one advantage of the parallel combination of resistors in a circuit, other than each getting equal voltage.