

Model Question Paper 1
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. A silver article turns black when kept exposed to air for a few days. This is because it reacts with: [1]
 - (a) Oxygen present in air
 - (b) Hydrogen sulphide present in air
 - (c) Nitrogen present in air
 - (d) Carbon dioxide present in air
2. Masons prepare mortar by mixing quicklime (CaO) with water. During this process, a large amount of heat is evolved. This reaction is an example of: [1]
 - (a) Exothermic combination reaction
 - (b) Endothermic decomposition reaction
 - (c) Exothermic displacement reaction
 - (d) Endothermic combination reaction
3. A farmer finds that his field has become too acidic for a good crop yield. To neutralise the soil, he should treat it with: [1]
 - (a) Common salt (NaCl)
 - (b) Slaked lime (Ca(OH)₂)
 - (c) Sugar
 - (d) Vinegar
4. The pH of human gastric juice, which helps digest food in the stomach, is usually between 1.5 and 2.5. Gastric juice is therefore: [1]
 - (a) Strongly alkaline
 - (b) Weakly alkaline
 - (c) Weakly acidic
 - (d) Strongly acidic
5. Jewellers make ornaments from an alloy of gold and copper rather than pure gold mainly because pure gold is: [1]

- (a) Too costly to shape
- (b) Too soft for ornaments
- (c) Non-reactive with skin
- (d) A poor conductor

6. A blacksmith heats an iron rod red-hot and beats it with a hammer into thin, flat tools. This property of metals — being beaten into thin sheets — is called: [1]

- (a) Ductility
- (b) Malleability
- (c) Sonorousness
- (d) Conductivity

7. Utensils for cooking and aircraft body parts are often made from a metal that does NOT react with dilute HCl to liberate hydrogen gas. This metal is: [1]

- (a) Zinc
- (b) Magnesium
- (c) Copper
- (d) Iron

8. During breathing in human beings, exchange of oxygen and carbon dioxide between blood and air takes place in the: [1]

- (a) Trachea
- (b) Alveoli
- (c) Bronchi
- (d) Larynx

9. A patient with kidney failure is put on dialysis. The dialysis machine artificially performs the function that is normally carried out in the nephron by the: [1]

- (a) Glomerulus and Bowman's capsule together (filtration and selective reabsorption)
- (b) Glomerulus only
- (c) Urethra
- (d) Ureter

10. On a hot afternoon, the stomata of a plant close to reduce water loss. This opening and closing of stomata is mainly controlled by changes in the _____ of the guard cells. [1]

- (a) Chlorophyll content
- (b) Turgor pressure
- (c) Nuclear size
- (d) Cell wall thickness

11. When your hand accidentally touches a hot vessel, you pull it away instantly, even before you feel the pain. This quick, involuntary response is an example of a: [1]

- (a) Voluntary action
- (b) Reflex action
- (c) Hormonal response
- (d) Growth movement

12. A hormone secreted by the pancreas lowers blood sugar level; its insufficient secretion or action leads to diabetes. This hormone is: [1]

- (a) Adrenaline
- (b) Insulin
- (c) Thyroxine
- (d) Testosterone

13. An accident damages a part of a cyclist's brain, after which he can no longer balance himself on the cycle even though his muscles are otherwise fine. The damaged part is most likely the: [1]

- (a) Cerebrum
- (b) Cerebellum
- (c) Medulla
- (d) Spinal cord

14. Electricians always connect a fuse of appropriate rating in household circuits. The main purpose of the fuse is to: [1]

- (a) Increase the current in the circuit
- (b) Protect appliances by breaking the circuit during a short-circuit/overload
- (c) Reduce the household voltage
- (d) Increase the resistance of appliances

15. Two resistors of 4Ω and 6Ω are connected in parallel. Their equivalent resistance is: [1]

- (a) 10Ω
- (b) 2.4Ω
- (c) 24Ω
- (d) 1.5Ω

16. An electric bulb is rated '100 W, 220 V'. The current drawn by the bulb in normal use and its resistance are respectively close to: [1]

- (a) 0.45 A, 484Ω
- (b) 2.2 A, 100Ω
- (c) 0.45 A, 220Ω
- (d) 4.5 A, 48Ω

17. A ray of light travelling from air into water bends towards the normal at the point of incidence. This happens because water is: [1]

- (a) Optically rarer than air
- (b) Optically denser than air
- (c) Opaque
- (d) Translucent only

18. A dentist uses a mirror that gives an enlarged, erect (virtual) image of a tooth. For this, the mirror is a concave mirror and the tooth (object) must be placed: [1]

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

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

Assertion (A): Convex mirrors are preferred as rear-view/side mirrors in vehicles.

Reason (R): A convex mirror always forms a virtual, erect and diminished image of objects placed in front of it, giving the driver a wider field of view.

- (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): A strong solution of sodium hydroxide gradually loses its basic strength when left exposed to air for a long time.

Reason (R): Sodium hydroxide absorbs carbon dioxide from air and reacts with it to form sodium carbonate, decreasing the concentration of free OH^- ions.

- (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. In the laboratory, dilute sulphuric acid is added to zinc granules taken in a test tube, and a gas is evolved which burns with a 'pop' sound. Write the balanced chemical equation for this reaction and state its type. [2]

22. A milkman adds a small amount of baking soda to fresh milk before it is transported long distances in summer. (a) Why does he do this? (b) What change would this bring about in the pH of milk? [2]

23. Pickles and other acidic foods are stored in plastic or glass containers, but never for long in copper or brass vessels. Explain why, giving the relevant chemical reaction. [2]

24. State two functions each of xylem and phloem in a flowering plant. [2]

25. When you walk from a brightly lit room into a dim room, the pupil of your eye automatically widens after a few seconds. Name the type of muscle responsible for this action and briefly explain how the change occurs. [2]

26. Two resistors, each of $4\ \Omega$, are connected (i) in series, and (ii) in parallel, across a 6 V battery. Calculate the current drawn from the battery in each case. [2]

SECTION C

Question numbers 27 to 33 carry 3 marks each.

27. A few drops of silver nitrate solution are added to a solution of sodium chloride in a test tube; a white precipitate is formed immediately. (a) Write the balanced chemical equation for the reaction. (b) Identify the type of reaction. (c) Name another type of reaction to which this reaction also belongs. [3]

28. Common salt (sodium chloride) is an important raw material for a number of chemicals used in daily life. Name the chemical manufactured from it in each case and state one use: (a) an antacid ingredient used to relieve acidity, (b) a chemical used to disinfect drinking water and bleach clothes, (c) a chemical used in the manufacture of glass and detergents. [3]

29. Sodium metal is always stored in kerosene oil in the laboratory. Explain why, and write the balanced equation for the reaction of sodium with water. [3]

30. Explain what is meant by 'double circulation' of blood in the human body, and state one reason why it is essential for warm-blooded animals like humans. [3]

31. Using the example of accidentally touching a hot object, describe the pathway of a reflex arc, naming all the parts of the nervous system involved in the correct order. [3]

32. State Ohm's law. A wire of resistance R is cut into two equal halves. What is the resistance of each half, and what is the equivalent resistance when both halves are joined in parallel? [3]

33. A student wants to use a concave mirror to obtain a real, inverted image that is exactly the same size as the object. Where should the object be placed? Draw a labelled ray diagram to justify your answer. [3]

SECTION D

Question numbers 34 to 36 carry 5 marks each.

34. A shopkeeper has two unlabelled bottles, one containing vinegar (dilute acetic acid) and the other a baking soda solution. (a) How can he identify each using only blue and red litmus paper? (b) Write the balanced equation when the two solutions are mixed. (c) Name the gas evolved and describe a test to confirm its identity. (d) State the type of reaction taking place. [5]

OR

A student sets up an experiment by placing clean iron nails in a solution of copper sulphate. (a) State the colour change observed in the solution and on the nails. (b) Write the balanced chemical equation. (c) Name the type of reaction. (d) Explain, using the reactivity series, why this reaction occurs, and state one real-life application of such reactions.

35. Metals differ widely in their reactivity, and this decides how they are extracted from their ores. Explain, with one example each, how metals of (a) low reactivity, (b) medium reactivity, and (c) high reactivity are obtained in their pure form. Also state why sodium and potassium are never found free in nature. [5]

OR

Copper obtained by the reduction of its ore is not pure enough for use in electrical wires. Describe, step by step, how impure copper is purified by electrolytic refining, naming the electrodes, electrolyte and what happens to impurities. State why this level of purity matters for electrical use.

36. Describe the structure of a nephron and explain, in sequence, how urine is formed in the human kidney. Explain, in this context, why a patient with complete kidney failure needs to undergo dialysis. [5]

OR

Explain the process of nutrition in human beings from the mouth to the small intestine, mentioning the role of at least three digestive enzymes/juices. Why is it advised that we should chew our food thoroughly before swallowing?

SECTION E

Question numbers 37 to 39 are source/case-based questions carrying 4 marks each. Attempt any 4 out of the 5 sub-parts in each question, unless stated otherwise.

Case Study 1 — Question 37 [4 Marks]

Whenever we eat spicy or oily food, the stomach sometimes produces excess hydrochloric acid, leading to acidity and a burning sensation. Doctors often recommend antacid tablets, which contain mild bases such as magnesium hydroxide, to relieve the discomfort. At home, a pinch of baking soda (sodium hydrogen carbonate) dissolved in water is a common remedy for the same problem, as it also neutralises excess acid in the stomach.

- (i) Name the acid present in human gastric juice. [1]
- (ii) What type of chemical reaction occurs when an antacid neutralises excess acid in the stomach? [1]
- (iii) Write the chemical formulae of milk of magnesia and baking soda. [1]
- (iv) Why should antacid tablets not be taken in excessive amounts? [1]

OR What would happen to the pH of the stomach contents immediately after taking an antacid?

Case Study 2 — Question 38 [4 Marks]

Meera's grandfather has recently been diagnosed with type-2 diabetes. His doctor explained that a gland in his abdomen is not producing enough of a certain hormone, causing his blood glucose level to remain high. The doctor advised him to control his diet, walk regularly, and take his prescribed medicine on time, warning that poorly managed diabetes can, over the years, damage the kidneys and the eyes.

- (i) Name the hormone whose deficiency (or reduced action) causes diabetes. [1]
- (ii) Name the gland that secretes this hormone. Is this gland exocrine, endocrine, or both? [1]
- (iii) State the normal function of this hormone in the body. [1]
- (iv) Suggest one reason why regular exercise helps a diabetic patient manage his blood glucose level. [1]

OR Name one hormone secreted by the adrenal gland during a stressful situation and state one of its effects on the body.

Case Study 3 — Question 39 [4 Marks]

A household uses the following electrical appliances every day: two bulbs of 60 W each for 5 hours, one electric iron of 1000 W for 1 hour, and one fan of 100 W for 10 hours. The electricity supply company charges Rs 6 per unit (kWh) of energy consumed, and bills the household once every 30 days.

- (i) Define the commercial unit of electrical energy, 1 kWh. [1]
- (ii) Calculate the total energy consumed per day by all the appliances, in kWh. [1]
- (iii) Calculate the electricity bill for 30 days at the given rate. [1]
- (iv) Suggest one practical way this family could reduce its monthly electricity consumption. [1]

OR State one difference between electrical energy and electrical power.