

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. A scientist wants to test whether the number of hours of sunlight received affects how fast a plant grows. The height of the plant, which she measures every week, is called the: [1]
 - (a) Independent variable
 - (b) Dependent variable
 - (c) Controlled variable
 - (d) Hypothesis
2. Two students measure the length of the same table using the same metre scale but get slightly different readings each time. The best way to obtain a more reliable value of the length is to: [1]
 - (a) Use only the very first reading taken
 - (b) Take several readings and calculate their average
 - (c) Guess the length by looking at the table
 - (d) Use two different scales and simply add the two readings
3. Organisms that are too small to be seen with the naked eye and can be observed only with the help of a microscope are called: [1]
 - (a) Microorganisms
 - (b) Macro-organisms
 - (c) Fossils
 - (d) Vertebrates
4. A student examines a drop of pond water under a microscope and observes a tiny single-celled organism moving about using hair-like structures. This organism most likely belongs to the group called: [1]
 - (a) Bacteria
 - (b) Protozoa
 - (c) Fungi
 - (d) Algae

5. Rhizobium bacteria present in the root nodules of pulse (leguminous) plants are considered useful to farmers mainly because they: [1]

- (a) Cause diseases in the plant's roots
- (b) Convert atmospheric nitrogen into a usable form, enriching the soil
- (c) Produce antibiotics used in medicines
- (d) Decompose only dead leaves on the soil surface

6. A person who has been vaccinated against a disease usually does not fall sick even after later coming in contact with that disease's pathogen. This is because vaccination causes the body to: [1]

- (a) Destroy all microorganisms in the environment permanently
- (b) Produce antibodies and memory cells specific to that pathogen in advance
- (c) Permanently raise body temperature
- (d) Avoid the pathogen completely by chance

7. Which of the following is an example of a non-communicable disease? [1]

- (a) Common cold
- (b) Tuberculosis
- (c) Diabetes
- (d) Chickenpox

8. Washing hands with soap before eating mainly helps prevent disease by: [1]

- (a) Cooling down the hands
- (b) Removing or killing disease-causing microorganisms present on the hands
- (c) Increasing appetite
- (d) Hardening the skin of the hands

9. The glowing filament of an ordinary electric bulb is an example of the _____ effect of electric current. [1]

- (a) Chemical
- (b) Heating
- (c) Purely magnetic
- (d) Cooling

10. A compass needle kept near a wire deflects only when current flows through the wire, and returns to its normal position when the current is switched off. This experiment shows that: [1]

- (a) Current has no effect on magnets
- (b) A current-carrying wire produces a magnetic effect
- (c) All wires are magnetic even without current
- (d) Compass needles have no relation with electricity

11. In an electric fan, the current supplied to the motor makes the blades rotate continuously. This working of the fan's motor is mainly based on the: [1]

- (a) Heating effect of current
- (b) Magnetic effect of current
- (c) Chemical effect of current
- (d) Lighting effect of current only

12. A shopping trolley continues to roll forward for some distance even after a person stops pushing it, before finally coming to rest. The force that eventually brings it to rest is: [1]

- (a) Muscular force
- (b) Gravitational force pulling it downward
- (c) Frictional force between the wheels and the floor
- (d) Magnetic force

13. A gymnast lands on a soft, cushioned mat instead of a hard floor after a jump, to avoid injury. This works mainly because the soft mat: [1]

- (a) Increases the force felt by the gymnast
- (b) Increases the time taken to stop the gymnast, reducing the force experienced
- (c) Has no effect on the force experienced
- (d) Applies a non-contact force on the gymnast

14. The force by which the Earth pulls all objects towards its centre is called: [1]

- (a) Frictional force
- (b) Magnetic force
- (c) Gravitational force
- (d) Muscular force

15. A hand-held pump used to inflate a bicycle tyre pushes air into it, compressing it into a smaller volume. The pressure of the air inside the tyre after pumping, compared to atmospheric pressure outside, is: [1]

- (a) Much lower than atmospheric pressure
- (b) Exactly equal to atmospheric pressure
- (c) Much higher than atmospheric pressure
- (d) Zero

16. The layer of gases surrounding the Earth, which exerts pressure on all objects at its surface, is called the: [1]

- (a) Hydrosphere
- (b) Atmosphere
- (c) Lithosphere
- (d) Biosphere

17. On a hot summer afternoon near the coast, a cool sea breeze blows from the sea towards the land. This happens mainly because, in the afternoon: [1]

- (a) Land heats up faster than the sea, and the warm air rising above the land creates lower pressure that draws in cooler air from the sea
- (b) The sea becomes hotter than the land
- (c) Pressure over the sea suddenly becomes very low
- (d) Wind always blows from land to sea

18. Sugar crystals dissolve faster in hot tea than in cold tea mainly because, at a higher temperature, the water particles: [1]

- (a) Stop moving completely
- (b) Move faster and collide with the sugar particles more often, speeding up dissolving
- (c) Turn solid
- (d) Repel the sugar particles strongly

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

Assertion (A): It is much easier to compress the air inside a syringe (with its outlet closed) than to compress water inside the same syringe.

Reason (R): Particles in a gas like air are far apart with large empty spaces between them, whereas particles in a liquid like water are closely packed with very little empty space.

- (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): Wet clothes dry faster when spread out in the sun on a windy day than when bunched up in a shaded corner on a still day.

Reason (R): Increasing the exposed surface area and the temperature, together with moving air carrying away water vapour particles, all speed up the rate of evaporation.

- (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 student wants to test which of two brands of paper towel absorbs water better. Suggest two things she should keep the same (controlled) in her testing, apart from the brand of towel. [2]

22. State two harmful effects of microorganisms on human beings, giving one disease-causing example each for two different types of microbes. [2]

23. A locality reports a sudden outbreak of diarrhoea among several residents after the water supply pipeline develops a leak near a drain. Explain, in terms of microorganisms, how this could cause such an outbreak, and suggest one preventive measure. [2]

24. State two safety precautions that should be followed while handling household electrical appliances or wiring. [2]

25. A block of wood is pulled with a spring balance across two different surfaces — smooth glass and rough sandpaper — and the reading on the balance is noted each time. (a) On which surface would the reading be higher, and why? (b) What does this reading actually measure? [2]

26. Explain why a gas cylinder used for cooking gas is designed to be very strong and made of thick metal, using the idea of the pressure exerted by a gas. [2]

SECTION C

Question numbers 27 to 33 carry 3 marks each.

27. A group of students wants to investigate whether the mass of a paper boat affects how long it stays afloat before sinking. (a) Suggest one reasonable hypothesis they could test. (b) Name one variable (besides the shape of the boat) they must keep constant across all trials. (c) Why is keeping this variable constant important? [3]

- 28.** A greenish-black mould (*Rhizopus*) is often seen growing on bread left in a warm, humid place for a few days. (a) Name the kind of microorganism responsible. (b) State two conditions that favour its growth on the bread. [3]
- 29.** Explain the difference between communicable and non-communicable diseases, giving one example of each, and state why lifestyle-related diseases like diabetes and heart disease are classified as non-communicable. [3]
- 30.** The heating element (coil) of an electric kettle is usually made of nichrome, not copper, even though copper is a good conductor. Explain why nichrome is preferred, in terms of the heating effect of current. [3]
- 31.** State whether each of the following forces is a contact force or a non-contact force, giving a one-line reason: (a) A magnet attracting a paperclip. (b) The force applied when kicking a ball. (c) Gravity pulling a falling leaf downward. [3]
- 32.** Explain, using the idea of air pressure, why it is easy to drink a liquid using a straw, and state what would happen if you tried to use a straw that had a small hole punctured in its side. [3]
- 33.** Naphthalene balls placed in a cupboard slowly become smaller over several weeks and eventually disappear completely, without leaving any liquid behind, while the cupboard begins to smell of naphthalene. Explain this observation in terms of the particle nature of matter, naming the specific process involved. [3]

SECTION D

Question numbers 34 to 36 carry 5 marks each.

- 34.** A farmer wants to increase the fertility of his field without using too many chemical fertilisers. His neighbour suggests growing a crop of beans (a leguminous/pulse plant) every third season and ploughing the plant residue back into the soil. (a) Name the bacteria present in the root nodules of such pulse plants that help improve soil fertility. (b) Explain how these bacteria enrich the soil with a nutrient plants need. (c) Name the overall process by which atmospheric nitrogen gas is converted into a usable form for plants. (d) Suggest one other way (apart from growing pulse crops) in which microorganisms are useful in agriculture. [5]

OR

A school nurse notices that several students report similar cold-like symptoms one after another over a week, while only one particular student has diabetes, regardless of how much contact he has with classmates. (a) Classify the cold as communicable or non-communicable, and justify your answer. (b) Explain why the diabetic student's condition did not spread to classmates. (c) Suggest two general hygiene practices that could help reduce the spread of the cold among students. (d) Name one vaccine-preventable communicable disease other than the common cold.

- 35.** A delivery company tests two types of packaging trolleys — Trolley A has small, hard plastic wheels, while Trolley B has larger wheels fitted with ball bearings. Workers report that Trolley B is noticeably easier to push, even with the same load. (a) Name the force that makes pushing a loaded trolley difficult. (b) Explain, in terms of this force, why Trolley B is easier to push than Trolley A. (c) State one factor (other than the wheel type) that affects the amount of this force between two surfaces. (d) Give one everyday example where this same force is essential and must not be reduced too much. [5]

OR

A science exhibit shows a coil of wire wrapped around an iron nail, connected to a battery through a switch. When the switch is closed, the nail picks up small iron pins; when the switch is opened, the pins fall off

immediately. (a) Name the device created by this coil-and-nail arrangement. (b) Explain why the pins fall off as soon as the switch is opened. (c) State two ways the strength of this device could be increased. (d) Name one everyday device that uses this same principle to work.

36. A steel tumbler filled with ice-cold water soon has tiny water droplets forming on its outer surface, while a covered pot of boiling water on the stove shows its lid rattling and steam escaping from the sides. (a) Name the three common states of matter. (b) Explain, using the particle model, why ice, water and steam, all made of the same substance, have such different properties. (c) Name the process by which invisible water vapour in the air around the cold tumbler turns into visible water droplets on its surface. (d) Explain briefly why steam escaping from the boiling pot can cause a more severe burn than the same mass of boiling water. [5]

OR

A weather balloon released from the ground rises high into the atmosphere, expanding in size as it goes higher, and eventually bursts at a great height. (a) Explain, in terms of atmospheric pressure, why the balloon expands as it rises. (b) State how atmospheric pressure changes with increasing height/altitude. (c) Explain briefly why the balloon eventually bursts. (d) Name one instrument, other than a simple mercury barometer, that is commonly used to measure atmospheric pressure or altitude using pressure changes.

SECTION E

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

Case Study 1 — Question 37 [4 Marks]

During the monsoon, a village health worker records a rise in cases of a waterborne disease among people who fetch drinking water directly from a nearby pond, while those in the same village who use a hand pump connected to a covered underground source stay largely unaffected. She also notes that all children in the village have been given the oral polio vaccine as part of a government health drive.

- (i) Name one disease that can spread through contaminated pond water. [1]
- (ii) Explain why people drawing water from the covered hand pump remain largely unaffected compared to those using the open pond. [1]
- (iii) Explain how the oral polio vaccine protects children from getting polio. [1]
- (iv) Suggest two measures the village could adopt to make pond water safer for those who must still use it. [1]
OR Explain why it is important for ALL children in a community to be vaccinated, and not just a few, to control the spread of a communicable disease.

Case Study 2 — Question 38 [4 Marks]

In a school sports day, a shot-put ball, a badminton shuttlecock and a rubber ball are all thrown or hit by students. The teacher points out that the shuttlecock slows down and drops much faster than the rubber ball, even though both are hit with a similar force, and that all three objects eventually fall back to the ground rather than flying off forever.

- (i) Name the force that pulls all three objects back down towards the ground after they are thrown. [1]
- (ii) Suggest one reason why the shuttlecock slows down and falls faster than the rubber ball, even when hit with a similar force. [1]
- (iii) Is air resistance a contact force or a non-contact force? Justify your answer. [1]
- (iv) The heavier shot-put ball is not affected much by air resistance and follows a smooth curved path to the ground. Name the shape of this path and briefly explain why the ball's path curves downward instead of continuing in a straight line forever. [1]
OR Explain why a badminton shuttlecock is deliberately designed to experience high air resistance, considering how the game of badminton is played.

Case Study 3 — Question 39 [4 Marks]

A student performs a simple activity: she places a few crystals of purple potassium permanganate at the bottom of a beaker of still water without stirring, and observes that the purple colour slowly spreads throughout the water over several minutes, eventually colouring all the water evenly. She then repeats the activity with hot water instead of cold water and notices the colour spreads much faster.

- (i)** Name the process by which the purple colour spreads through the water without stirring. [1]
- (ii)** Explain, in terms of particles, why the colour eventually spreads evenly throughout the water. [1]
- (iii)** Explain why the colour spreads faster in hot water than in cold water. [1]
- (iv)** Would you expect this purple colour to spread faster, slower, or at about the same rate if similar crystals were placed in a jar of air instead of in water (assuming they could dissolve in air)? Justify your answer in terms of the particle model. [1]

OR Suggest what would happen to the rate of spreading of the colour if the same experiment were repeated using ice-cold water straight from the refrigerator.