

SCIENCE
Sample Question Paper 20
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 is a correct pair of organism and mode of nutrition? [1]**
(A) Green grass—holozoic
(B) Cuscuta—parasitic
(C) Mushroom—autotrophic
(D) Amoeba—saprotrophic
- 2. Which statement about voluntary actions is correct? [1]**
(A) They involve conscious control by the brain
(B) They occur only in plants
(C) They never use motor neurons
(D) They are always controlled by kidneys
- 3. The movement of water into root hairs from soil is mainly by: [1]**
(A) active transport of starch
(B) phagocytosis
(C) evaporation
(D) osmosis
- 4. A gene is best described as: [1]**
(A) a digestive enzyme in the stomach
(B) a hormone stored in bone
(C) a segment of DNA carrying information for a trait
(D) a complete red blood cell

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. An advantage of internal fertilisation in humans is that gamete fusion occurs: [1]

- (A) outside the body in water
(B) in the urinary bladder
(C) inside the placenta after birth
(D) inside the female reproductive tract

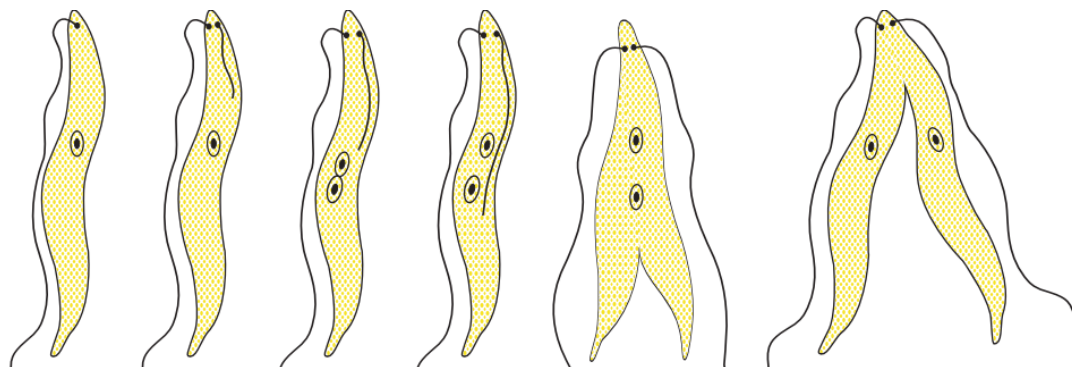
8. Assertion (A): The skull alone protects both the brain and the entire spinal cord.
Reason (R): The vertebral column surrounds the spinal cord. [1]

9. Assertion (A): All offspring produced asexually must have absolutely identical DNA.

Reason (R): DNA copying can introduce small variations. [1]

10. Attempt either A or B. [2]

A. The figure shows division in Leishmania. Explain why its fission has a more definite orientation than in Amoeba.



OR

B. Why should each daughter Leishmania receive hereditary material as well as cytoplasm?

11. How do receptors help the nervous system? State one consequence of receptor malfunction. [2]

12. Attempt either A or B. [2]

A. State two reasons why sexual reproduction produces greater diversity than simple copying from one parent.

OR

B. Why does reproduction maintain a species although it is not essential for an individual's immediate survival?

13. Propose three scientifically justified measures to reduce a school canteen's environmental impact. [3]

14. How do Mendel's results show that traits can be inherited independently? Use a dihybrid cross. [3]

15. A Tiwari Academy case study follows a person drinking little water on a hot day.
(a) Which organs regulate urine water loss? (b) Does reabsorption increase or decrease? (c) Predict urine volume and concentration. [4]

16. Trace energy from sunlight through producer, herbivore and carnivore. [5]

Attempt either A or B for the remaining 2 marks.

A. Why is the 10% rule an estimate? (2)

OR

B. Why cannot decomposers restore lost energy to producers? (2)

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. Which compound contains a triple bond? [1]

- | | |
|--------------|-------------|
| (A) Propanol | (B) Propyne |
| (C) Propane | (D) Propene |

18. Why is a chemical equation more informative when state symbols are added? [1]

- (A) They specify physical states of reactants and products
- (B) They change the atom counts
- (C) They prove all reactions are fast
- (D) They make every reaction reversible

19. Which of the following salts contain water of crystallisation:

- (i) Plaster of Paris, (ii) Washing soda,
(iii) Baking soda and (iv) Gypsum.

[1]

(A) (i), (ii) and (iii)

(B) (i), (iii) and (iv)

(C) (ii), (iii) and (iv)

(D) (i), (ii) and (iv)

20. An olfactory indicator is one whose:

[1]

(A) boiling point is always 100 °C

(B) colour alone is used for every test

(C) odour changes in acidic or basic media

(D) mass becomes zero in water

21. Which property makes a metal suitable for making a bell?

[1]

(A) Solubility in water

(B) Sonority

(C) Brittleness

(D) Low electrical conductivity

22. Which characteristic is typical of many covalent compounds?

[1]

(A) Poor electrical conductivity

(B) Very high ionic charge on every atom

(C) Good conduction in every solid state

(D) Presence of freely moving ions in pure form

23. The addition of soap to oily water helps cleaning because soap molecules have:

[1]

(A) two identical water-repelling ends

(B) only metallic ions

(C) no interaction with oil

(D) a water-attracting end and an oil-attracting end

24. Assertion (A): Soap's hydrocarbon tail dissolves readily in water.

Reason (R): The ionic end of a soap molecule is hydrophilic.

[1]

25. Attempt either A or B.

[2]

A. Write the equation for saponification of ethyl ethanoate and name the products.

OR

B. Why is hydrogenation useful in the food industry? Name a catalyst.

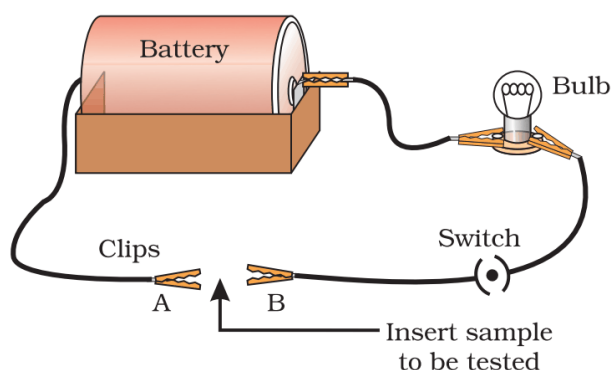
26. Describe the structure of soap and explain its cleaning action in water.

[3]

27. Attempt either A or B.

[3]

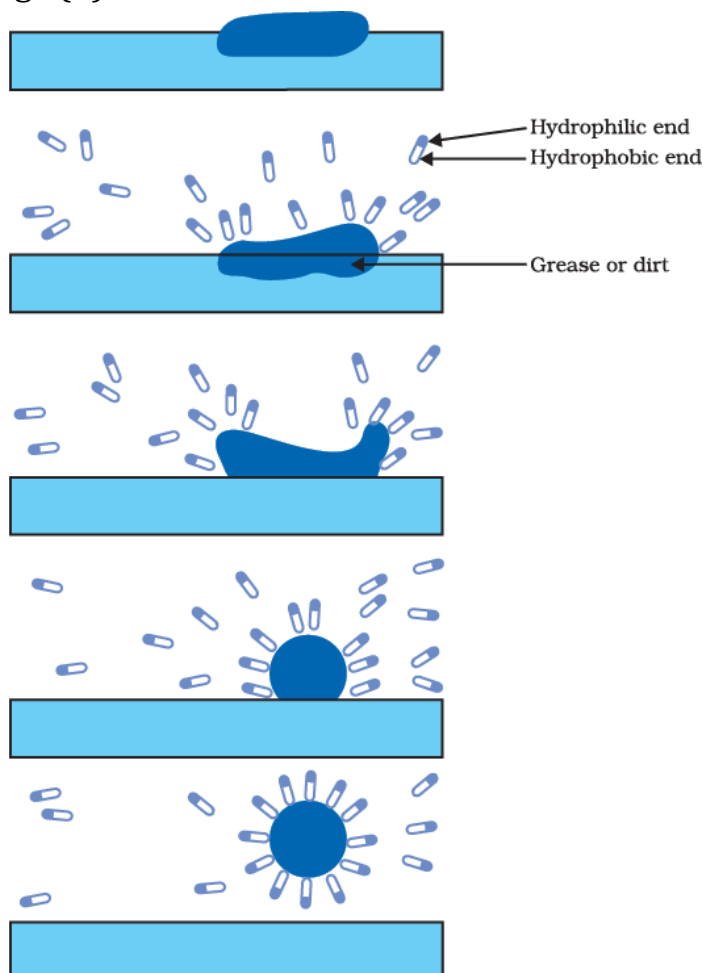
A. In the circuit with a gap between clips A and B, explain what bulb glow indicates, predict a metal and non-metal result and give a relevant exception.



OR

B. Why must the sample bridge both clips and why is bulb failure alone insufficient proof that a sample is an insulator?

28. The figure shows stages of removal of grease from a surface. (a) What happens to grease during rubbing? (b) What structure surrounds the detached droplet? [4]



Attempt either A or B for the remaining 2 marks.

A. Explain why rinsing with water can remove oil only after this process.

(2)

OR

B. Why does plain water remove greasy stains poorly? Give two molecular reasons. (2)

29. Classify combination, decomposition and displacement reactions, giving a balanced example of each. [5]

Give a balanced double-displacement reaction and explain the ion exchange. (2)

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. No magnetic force acts on a straight current-carrying conductor when it is: [1]

- (A) parallel to the magnetic field
- (B) perpendicular to the magnetic field
- (C) at 45° to the magnetic field
- (D) carrying maximum current at right angles to the field

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): An earth wire normally supplies the operating current to a healthy appliance.

Reason (R): It provides a low-resistance path if the metal body becomes live. [1]

33. Why do magnetic field lines never intersect? [2]

34. A 2 kW heater runs for 45 minutes. Find the energy consumed and its cost at ₹8 per kWh. [2]

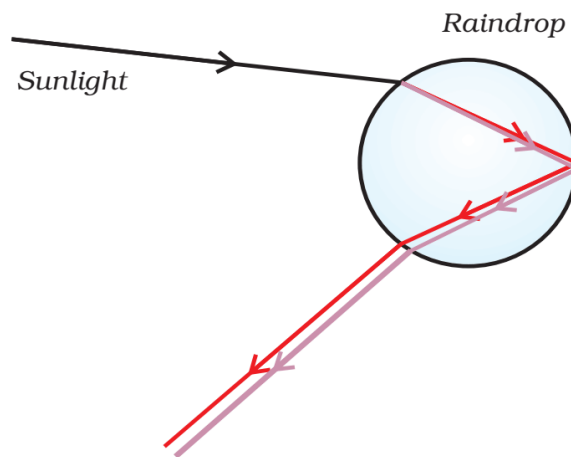
35. Explain how earthing, a fuse and correct loading provide different kinds of electrical protection. [3]

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]

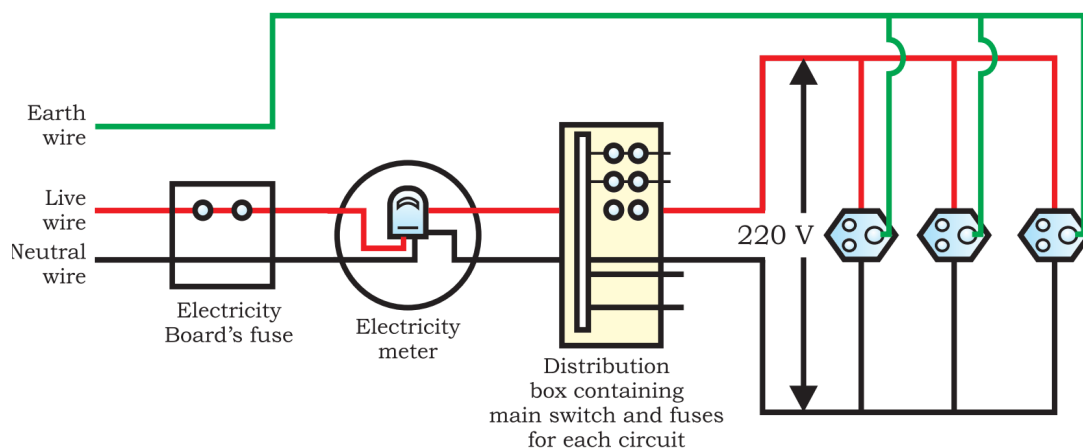
A. Use the raindrop figure to describe the sequence of optical events and state where the Sun must be relative to the observer viewing the rainbow.



OR

B. Why do suspended water droplets produce a rainbow only in suitable viewing directions?

38. The domestic circuit shown supplies 220 V. A 1.1 kW appliance and a 440 W appliance operate together. (a) Find their individual currents. (b) Find the total current. **[4]**



Attempt either A or B for the remaining 2 marks.

A. Explain why a 5 A circuit is unsuitable and why the branches are parallel.

OR

B. If the metal casing of an earthed appliance becomes live, explain the protective sequence.

39. A 220 V circuit supplies a 660 W fan-and-light group and a 1320 W heater. Calculate each current, combined current and equivalent resistance when both operate. **[5]**

Attempt either A or B for the remaining 2 marks.

A. Can a 5 A rated circuit safely supply both? Explain and give one practical remedy.

OR

B. If the heater runs for 30 minutes and the other group for 2 hours, calculate total energy and cost at ₹7 per unit.