

SCIENCE EXPLORATION

Sample Question Paper 17

Class IX | 2026-27

Time Allowed: 3 hours

Maximum Marks: 80

General Instructions

1. This paper contains 39 questions in three sections: A Biology, B Chemistry and C Physics. All questions are compulsory.
2. Each section has three internal choices. Attempt only one alternative wherever OR is given.
3. Marks are shown on the right. Show calculations and draw neat labelled diagrams where required.
4. Answer activity questions on paper; you do not need to perform the experiments. Use $g = 10 \text{ m s}^{-2}$ unless otherwise stated.

SECTION A

(Biology | Questions 1–16 | 30 marks)

1. Which of the following enables pollination without pollen arriving from another plant? [1]
(i) Menstruation (ii) Filament
(iii) Tissue culture (iv) Self-pollination
2. Which type of cell separates different cellular processes into membrane-bound compartments? [1]
(i) Eukaryotic cell (ii) Mitochondrion
(iii) Golgi apparatus (iv) Smooth endoplasmic reticulum
3. Identify the scientific term: the variety of life and its differences at several levels? [1]
(i) Biodiversity (ii) Mammalia
(iii) Annelida (iv) Aves
4. Which of the following includes bacteria and cyanobacteria? [1]
(i) Animalia (ii) Fungi
(iii) Protista (iv) Monera
5. Which of the following promotes mixing of genetic material between plants? [1]
(i) Binary fission (ii) Oviduct
(iii) Zygote (iv) Cross-pollination
6. Which of the following includes Amoeba, Paramecium and Euglena? [1]
(i) Animalia (ii) Monera
(iii) Protista (iv) Fungi

7. Which type of joint is involved when you bend your knees and ankles? [1]

- (i) Ball and socket
- (ii) Hinge
- (iii) Pivot

8. Which kingdom has organisms with chitinous cell walls and absorptive heterotrophic nutrition? [1]

- | | |
|----------------|--------------|
| (i) Fungi | (ii) Plantae |
| (iii) Animalia | (iv) Monera |

9. Which kingdom primarily contains multicellular photosynthetic organisms with cellulose cell walls? [1]

- | | |
|----------------|---------------|
| (i) Plantae | (ii) Protista |
| (iii) Animalia | (iv) Monera |

10. State one defining feature of each of the following: Nucleus and Eukaryotic cell. [2]

11. The Figure shows a fern. [2]



(a) Name its plant group.

(b) Name the tissues that transport water and food in it.

12. A. You may have noticed that fibres of coconut husk are hard and brittle, whereas the leaf stalks of coriander are soft and flexible. Find out the reason. [2]

OR

B. State one defining feature of each of the following: Chlorenchyma and Epidermis.

13. A. During a Tiwari Academy science-club session, a group works on this task. For Grafting and Sepal, give one defining feature and one function or significance of each. [3]

OR

B. For Vegetative propagation and Cross-pollination, give one defining feature and one function or significance of each.

14. The Figure shows bread mould with round sacs at the ends of stalks. [3]



- (a) Name the round spore-bearing structures.
- (b) What are released from these structures?
- (c) How can these units reach a new bread surface?

15. Identify the two entries described below.

A: Strong fibrous connective tissue joining muscle to bone.

B: Firm but flexible connective tissue with cells in a matrix.

For each, state its function or significance and a relevant feature. [4]

16. A. Answer the following about Mitosis and Golgi apparatus:

- (a) State one defining feature and one role of Mitosis.
- (b) State one defining feature and one role of Golgi apparatus.
- (c) Give one application or example of Mitosis. [5]

OR

B. Answer the following about Smooth endoplasmic reticulum and Mitochondrion:

- (a) State one defining feature and one role of Smooth endoplasmic reticulum.
- (b) State one defining feature and one role of Mitochondrion.
- (c) Give one application or example of Smooth endoplasmic reticulum.

SECTION B

(Chemistry | Questions 17–29 | 25 marks)

17. Which of the following concentrates settling particles at the bottom? [1]

- | | |
|-------------------------|---------------------|
| (i) Simple distillation | (ii) Tyndall effect |
| (iii) Sedimentation | (iv) Chromatography |

18. Which entry is correctly associated with this feature: it is strongly deflected only in relatively close encounters with a nucleus? [1]

- | | |
|-------------------------|-------------------------------|
| (i) Mass number | (ii) Alpha particle |
| (iii) Valence electrons | (iv) Electronic configuration |

19. Which entry is correctly associated with this feature: it is positively charged because it contains protons? [1]

- | | |
|--------------------------------|-------------------------|
| (i) Mass number | (ii) Nucleus of an atom |
| (iii) Electronic configuration | (iv) Isotopes |

20. Which entry is correctly associated with this feature: it has shell number one? [1]

- | | |
|---------------|---------------------------|
| (i) K shell | (ii) Valence electrons |
| (iii) L shell | (iv) Dalton atomic theory |

21. Which entry is correctly associated with this feature: it has shell number two? [1]

- | | |
|-----------------------|--------------|
| (i) Valence electrons | (ii) Neutron |
| (iii) Isotopes | (iv) L shell |

22. Which method separates a liquid from settled sediment by carefully pouring off the liquid? [1]

- | | |
|----------------------|------------------------------|
| (i) Sublimation | (ii) Fractional distillation |
| (iii) Centrifugation | (iv) Decantation |

23. Which of the following separates fine suspended material more quickly than standing alone? [1]

- | | |
|-------------------------------|---------------------|
| (i) Decantation | (ii) Centrifugation |
| (iii) Fractional distillation | (iv) Solute |

24. Which of the following recovers a non-volatile dissolved solid? [1]

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|----------------------|--------------------------|
| (i) Evaporation | (ii) Homogeneous mixture |
| (iii) Centrifugation | (iv) Sedimentation |

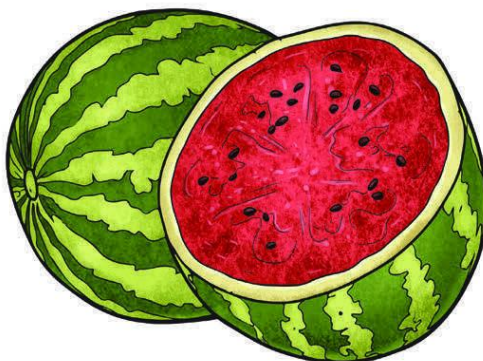
25. A. What conclusion did Rutherford draw about the position and characteristics of the atom's positively charged part based on the few alpha particles that bounced back or were deflected at large angles in the gold foil experiment? [2]

OR

B. A neutral model atom in a particle-counting task contains 7 protons and 10 neutrons. Determine its atomic number and mass number.

26. Dalton described atoms as rearranging in chemical reactions. Use this idea to explain why ordinary chemical reactions do not convert carbon atoms into oxygen atoms. State the law governing the total mass in this reaction. [3]

27. A. A watermelon is shown as an analogy for an early model of the atom. [3]



- (a) Which atomic model is associated with this analogy?
- (b) What do the seeds represent?
- (c) What does the surrounding flesh represent?

OR

B. A neutral model atom in a particle-counting task contains 8 protons and 11 neutrons. Determine its atomic number and mass number. How many electrons does it contain?

28. State whether the following statements are True or False. Also, correct the False statements.

- (i) Salt can be separated from a salt solution by evaporation or distillation.
- (ii) Distillation can be used for separation of two liquids even when these have the same boiling point.
- (iii) In paper chromatography, the solvent level should be above the sample spot at the beginning of the experiment.
- (iv) Evaporation and crystallization are the same processes. [4]

29. A. Answer the following about Chemical formula and Formula unit:

- (a) State one defining feature and one role of Chemical formula.
- (b) State one defining feature and one role of Formula unit.
- (c) Give one application or example of Chemical formula. [5]

OR

B. For magnesium chloride, MgCl_2 , use relative atomic masses $\text{Mg} = 24$, $\text{Cl} = 35.5$. Calculate the formula unit mass and the total mass of 7 formula units in u. Explain why formula unit is used here rather than an isolated molecule. State whether multiplying the number of formula units changes their composition. What must the total ionic charge in a formula unit be?

SECTION C

(Physics | Questions 30–39 | 25 marks)

30. Identify the scientific term: two simultaneous forces exerted by two interacting bodies on each other? [1]

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|--------------------------|---------------|
| (i) Action–reaction pair | (ii) Momentum |
| (iii) Unbalanced forces | (iv) Inertia |

31. Identify the scientific term: the SI unit of work and energy? [1]

- | | |
|-------------|------------------------|
| (i) Lever | (ii) Mechanical energy |
| (iii) Joule | (iv) Kinetic energy |

32. Which of the following describes a change in position with direction? [1]

- | | |
|--------------------|----------------------|
| (i) Uniform motion | (ii) Speed |
| (iii) Displacement | (iv) Reference frame |

33. Give two branches of science that help explain how a protective mask works, and state the contribution of each. [2]

34. An experiment is being set up that requires echoes to arrive at least 0.2 s after the emission of sound. What minimum distance should a reflecting surface be placed at? Assume the speed of sound to be 343 m s^{-1} . [2]

35. A motorbike moving with initial velocity 28 m s^{-1} and constant acceleration stops after travelling 98 m. Find the acceleration of the motorbike and the time taken to come to a stop. [3]

36. A. A tractor pulls a harrow (a ploughing tool) of mass m_1 with a net force F resulting in an acceleration of a_1 . The same tractor pulls a trolley of mass m_2 with a force F producing an acceleration of a_2 . If the tractor now pulls the trolley with the harrow placed on it (with the same force F), then obtain an expression for the resulting acceleration in terms of a_1 and a_2 . Ignore friction. [3]

OR

B. For Momentum and Inertia, give one defining feature and one function or significance of each.

37. Answer the following about Cryosphere and Greenhouse effect:

- (a) State one defining feature and one role of Cryosphere.
(b) State one defining feature and one role of Greenhouse effect.
(c) Give one application or example of Cryosphere. [5]

38. A. A roller coaster is shown in the Figure.

[4]



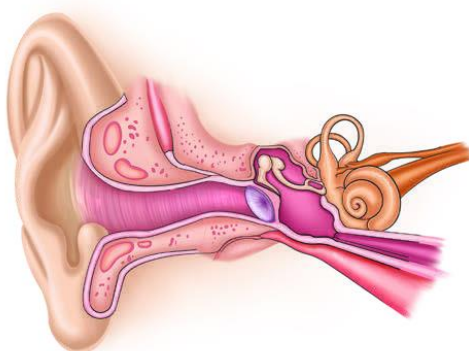
- (a) At which position is gravitational potential energy greater: high on a track or low on the track?
- (b) Ignoring friction, what happens to kinetic energy during a descent?
- (c) Why can the car not climb higher than its starting level without an additional energy input in the idealised case?
- (d) If 5,000 J of potential energy is lost and 500 J becomes thermal energy, find the gain in kinetic energy.

OR

B. A frictional force of 24 N opposes a sledge over 5 m. Find the work done by friction and the corresponding decrease in kinetic energy if no other force does work. Distinguish joule from watt. State the law of energy conservation.

39. A. The Figure represents the human ear.

[3]



- (a) Which outer structure collects sound waves?
- (b) Which thin membrane vibrates when sound reaches it?
- (c) What is the role of the small middle-ear bones?

OR

B. A sonar pulse in water of sound speed 1500 m s^{-1} returns after 0.20 s. Calculate its complete travel distance and the depth of the reflector directly below the source. What happens to pitch if the source frequency increases?