O. P. JINDAL SCHOOL, SAVITRI NAGAR

Half Yearly Examination - (2026 – 2027)

Class:IX **MM: 50**

Subject:SCIENCE(086) **Time: 2Hrs.**

1. *All questions are compulsory.*
2. *There are three sections in this question paper.*
3. *Section A consists of 10 questions (Q1 to Q10) of biology, section B consist of 8 questions (Q11 to 18) of chemistry and section C consists of 6 questions (Q 19 tO Q24) of physics.*
4. *There are some internal choices in some of the questions of 2 marks, 3 marks and 5 marks in each sections.*

SECTION A

Q1. Which cell organelle is known as "Protein factory" ? **(1M)**

(a)Ribosome (b)Mitochondria

(c)Golgi apparatus (d)Lysosome

Q2. Which structure controls the movement of substances into and out of the cell? **(1M)**

(a)Cell wall (b) Cytoplasm

(c)Plasma membrane (d) Nucleus

Q3. Which tissue provides flexibility and support to plants? **(1M)**

(a)Parenchyma (b) Collenchyma

(c)Sclerenchyma (d) Xylem

Q4. Which tissue is responsible for the transport of water and minerals in plants? **(1M)**

(a) Phloem (b) Xylem

(c) Parenchyma (d) Collenchyma

The following two questions below consists of an **Assertion (A)** and a **Reason (R).** Use the following key to choose the appropriate answer.

(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.

Q5. Assertion (A): Plant cells are generally more rigid than animal cells. **(1M)**

Reason (R): Plant cells possess a cell wall outside the plasma membrane.

Q6. Assertion (A): Meristematic cells divide continuously. **(1M)**

Reason (R): Meristematic tissue consists of actively dividing cells.

Q7. "Lysosomes are a kind of waste disposal system of a cell". Justify the statement. **(2M)**

OR

Where does storage, packing and dispatching process of the required materials take place in a cell ? What other functions does the above cell organelle perform ?

Q8. State the three main functions of the cell membrane . **(3M)**

OR

Name the three types of meristematic tissues and mention their locations.

Q9. Plant cells, in addition to the plasma membrane, have another rigid outer covering called the cell wall. The cell wall lies outside the plasma membrane. The plant cell wall is mainly composed of cellulose. Cellulose is a complex substance and provides structural strength to plants. When a living plant cell loses water through osmosis there is shrinkage or contraction of the contents of the cell away from the cell wall. This phenomenon is known as plasmolysis. A student observed a plant cell under a microscope. The cell had a definite outer boundary, a large vacuole and green structures inside the cytoplasm. These structures help the plant prepare food. **(4M)**

(i)Name the outer rigid covering in plant cell.
(ii)What is the reason behind structural strength of plant cell?
(iii)What is the function of the large vacuole?
(iii)Which is the main constituent of cell wall?

Q10. Attempt either **(A)** or **(B):** **(5M)**

(A):

(i)Differentiate between eukaryotic and prokaryotic cells in terms of
(a) Size (b) Chromosomes (c) Cell organelles.
(ii)Why do plant cells possess large vacuoles?
(iii)Which cell organelle is associated with ATP production ? How is this organelle able to make its own proteins ?

OR

(B):

(i)Which tissue makes up the husk of a coconut? What is its cell nature?
(ii)Compare the three types of simple permanent tissues (Parenchyma, Collenchyma, Sclerenchyma) based on cell wall thickening and functions.

SECTION B

Q11.A mixture of sulphur and carbon disulphide is – **(1M)**

(a) heterogeneous and shows Tyndall effect
(b) homogeneous and shows Tyndall effect
(c) heterogeneous and does not show Tyndall effect
(d) homogeneous and does not show Tyndall effect

Q12. Which subatomic particle contributes least to the mass of an atom? **(1M)**

(a)Electron (b)Neutron
(c)Proton (d)Nucleons

Q13. The number of electrons in an element X is 15, and the number of neutrons is 16. Which of the following is the correct representation of the element? **(1M)**

(a) ${}^{31}_{15}X$ (b) ${}^{31}_{16}X$
(c) ${}^{16}_{15}X$ (d) ${}^{31}_{15}X$

The question below consists of an **Assertion (A)** and a **Reason (R).**Use the following key to choose the appropriate answer.

(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.

Q14. **Assertion (A)**: Mustard oil and water can be separated by a separating funnel. **(1M)**
Reason (R): They are miscible liquids with different densities.

Q15. Two miscible liquids, A and B, are present in a mixture. The boiling point of A is 60°C and the boiling point of B is 90°C. Suggest a method to separate them and justify your answer. **(2M)**

Q16. Attempt either **(A)** or **(B)**: **(2M)**

(A):
Two students, A and B are preparing sugar solutions for an experiment. Student A dissolves 30g of sugar in 70g of water. Student B dissolves 30g of sugar in 100 g of water.
(i)Calculate the mass percentage (% m/m) concentration of sugar in each student's solution.
(ii)Whose solution is the most concentrated? Explain why.

OR

(B):
A solution is prepared by dissolving 150g of cane sugar in 600 g of water. Calculate the mass percent of each component of the solution.

Q17. Attempt either **(A)** or **(B)**: **(3M)**

(A):
Consider the following atoms and answer the questions
Atom A: ${}^{14}_{6}A$
Atom B: ${}^{14}_{7}B$
(i)What is the relationship between A and B?
(ii)Calculate the number of protons and neutrons in each.
(iii)Why do they have different chemical properties?

OR

(B):
Raman was discussing the structure of atom with his classmates. During the discussion, he learnt that an element X has a mass number of 31 and contains 16 neutrons. Based on this information, answer the following questions:
(i)How many electrons and protons does element X have?
(ii)What is its atomic number?
(iii)Identify the element X.

Q18. Read the given passage carefully and answer the following questions. **(4M)**
Rutherford performed the alpha-particle scattering experiment using a thin gold foil. Most of the alpha particles passed straight through the foil, while a few were deflected through small angles and a very few bounced back. Rutherford concluded that most of the space inside an atom is empty, while almost all the mass and positive charge are concentrated in a very small, dense region called the nucleus.
(i)What did the passage of most alpha particles through the gold foil indicate?
(ii)What is the positively charged central part of an atom called?
(iii)Where is almost all the mass of an atom concentrated?
(iv)Why were a few alpha particles deflected?

OR

(iv)Draw atomic structure of ${}^{14}_{6}C$ atom.

SECTION C

Q19. A ball at rest is hit by a bat and moves with velocity 30 ms^{-1}. If mass of ball is 0.2 kg and contact time is 0.1 seconds, average force exerted is **(1M)**

(a)30 N (b)40 N
(c)50 N (d)60 N

Q20. If mass of an object is decrease by 20 % and its velocity is increased by 60% then the momentum will : **(1M)**

(a)increase by 40% (b)decrease by 28%
(c)increase by 28% (d)decrease by 40%

The following question consist of one statement Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

(a)Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).
(b)Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c)Assertion (A) is true, but Reason (R) is false.
(d)Assertion (A) is false, but Reason (R) is true.

Q21. Assertion: A car moving at 20 m/s towards east and another car moving at 20 m/s towards west have the same velocity.
Reason : Velocity is a vector quantity and includes direction. **(1M)**

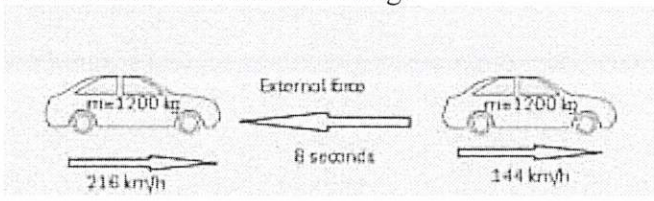
Q22. Attempt either **(A)** or **(B):** **(3M)**

(A):
(i) State and prove Newton second law of motion.
(ii)Prove 1 N = 10^5 dyne.

OR

(B):
(i)Why does a passenger fall backward when a bus starts suddenly?
(ii)A cart is pulled by 80 N eastward while friction acts with 30 N westward. Find:
(a)The net force
(b)The direction of motion/change in motion

Q23. While going on a trip, Mamta realised that her taxi was moving along a straight line with a uniform velocity of 216 km/h. Then velocity of the taxi Mamta down to 144 km/hr in 8 seconds by an external force. The mass of the taxi is 1200 kg. **(4M)**



(i)Find the initial velocity and final velocity of the car in meter second.
(ii)Find acceleration of car.
(iii)Find the change in momentum.
(iv)How much external force is applied on taxi?

OR

(iv)Find the momentum in the S.I unit of 100 kg car moving with velocity
(a)18 km/hr . (b)10cm/s.

Q24. Attempt either **(A)** or **(B)**: **(5M)**

(A):

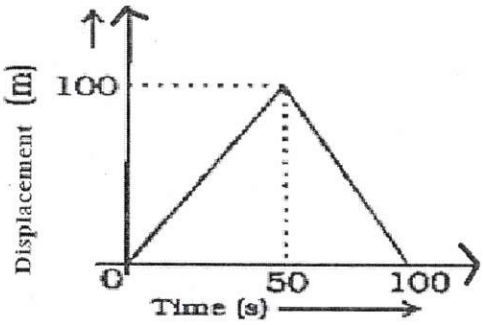
(i) A cyclist travels 10 km in 30 minutes and then 15 km in 45 minutes. Calculate the average speed for the entire journey.

(ii) A car starts from rest and accelerates uniformly to 20 m s^{-1} in 5 seconds. It then travels at 20ms^{-1} for 10 seconds and finally applies the brake (with uniform acceleration) to stop in 6 seconds. Find the total distance travelled.

OR

(B):

(i) A girl walks along a straight path to drop a letter in the letterbox and comes back to her initial position. Her distance–time graph is shown below. Plot a velocity–time graph for the same. (No Graph paper is required .Draw in same answer sheet provided).



(ii) A stone is dropped from a height of 196 m above the ground. Calculate its velocity just before it hits the ground and the time taken to reach the ground. (Take g= 9.8ms^{-2})

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