ST KABIR PUBLIC SCHOOL

SECTOR 26, CHANDIGARH, 160019

POST MID TERM EXAMINATION (2024-25)

Class- IX **Duration- 3Hr**
Subject- SCIENCE (086) **Max. Marks -80**

General Instructions:

i) This question paper consists of 39 questions in 5 sections.
ii) All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
iii) Section A consists of 20 objective type questions carrying 1 mark each.
iv) Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
v) Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
vi) Section D consists of 3 Long Answer type questions carrying 05 marks each. Answers to these questions should be in the range of 80 to 120 words.
vi) Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

SECTION – A

Select and write one most appropriate option out of the four options given for each of the questions 1 – 20

Q 1. What happens to the particles of a gas when it is compressed at a constant temperature? **(1)**
A. The particles move faster
B. The particles slow down
C. The space between the particles decreases
D. The particles expand

Q 2. Why does increasing the surface area of a liquid enhance its rate of evaporation? **(1)**
A. It increases the temperature of the liquid
B. It allows more particles to escape into the vapor phase
C. It decreases the vapour pressure of the liquid
D. It increases the intermolecular forces within the liquid.

Q 3. In an experiment, two containers with equal volumes are kept at the same temperature. One contains pure water, and the other contains a saltwater solution. Which container will have a higher boiling point and why? **(1)**
A. Pure water, because it has fewer solute particles.
B. Saltwater solution, because dissolved salt increases the boiling point.
C. Both will have the same boiling point since the temperature is the same.
D. Saltwater solution, because salt lowers the boiling point.

Q 4. You are given two solutions: one is a solution of salt in water, and the other is a solution of sugar in water. How would you differentiate between them without tasting? (1)

A. By checking the colour of the solutions
B. By using the solubility of the substances
C. By checking their boiling points
D. By performing a Tyndall effect test

Q 5. Why is the charge on colloidal particles important in the stability of colloids? (1)

A. It prevents the colloidal particles from settling down.
B. It helps in the coagulation of the colloids.
C. It allows colloidal particles to dissolve completely.
D. It decreases the size of the particles.

Q 6. What is the concentration of a solution containing 20 grams of potassium nitrate (KNO_3) dissolved in 180 grams of water? (1)

A. 11.11% B. 10% C. 9.11% D. 20%

Q 7. Which of the following sets of compounds contains both monoatomic and diatomic molecules? (1)

A. O_2, H_2O, NaCl
B. H_2, O_3, CO_2
C. Na, Cl_2, NH_3
D. H_2, O_2, He

Q 8. Cork is a specialized tissue derived from the outer layer of the bark of certain trees. Analyse the following statements about cork and identify the correct option: (1)

1. Cork cells are dead at maturity and provide protection.
2. Cork is primarily composed of lignin and cellulose.
3. Cork serves as a barrier to water loss and pathogens.

A. Only statement 1 is correct.
B. Statements 1 and 3 are correct.
C. All statements are correct.
D. Only statement 2 is correct.

Q 9. Which of the following acts as a garbage disposal system of the cell? (1)

A. Vacuole B. Mitochondria C. Lysosome D. Golgi body

Q 10. Which of the following nutrients is not available in fertilizers. (1)

A. Iron B. Nitrogen C. Potassium D. Phosphorous

Q 11. Study the provided figure carefully, which represents a type of plant tissue. Based on your understanding of plant anatomy and functions, analyse the characteristics of the tissue depicted and select the correct identification. (1)

A. Angular collenchyma, in which wall thickenings are present at the angles.
B. Xylem vessel that forms long channels for conduction of water and minerals.
C. Phloem parenchyma with abundant food reserve.
D. Sclerenchyma, in which uniform wall thickenings are present.

(1)

Q 12. A farmer decides to use genetically modified crops. What is a potential benefit of this choice?
A. Higher pesticide use B. Increased resistance to pests
C. Lower nutritional value D. Longer growth periods

Q 13. In which of the following cases, the distance moved and the magnitude of displacement are equal? (1)
A. If a car is moving on a straight road B. If a car is moving on a circular path
C. To and fro motion of a pendulum. D. Earth revolving around the Sun.

Q 14. Four metal balls A, B, C and D having radius of 2.5 cm each are made of Copper, Aluminium, Gold and Iron respectively. The densities of Copper, Aluminium, Gold and Iron are 8.9 g/cm^3, 2.7 g/cm^3, 19.3 g/cm^3 and 7.8 g/cm^3 respectively. When the balls A, B, C and D are tied with threads, suspended from the hook of a spring balance and immersed completely in strong salty water, one by one, the apparent loss in weight will be: (1)
A. maximum in ball B B. maximum in ball C
C. minimum in ball B D. same in all the balls

Q 15. If R_e= radius of earth and the value of 'g' at the surface of earth is 10 ms^{-2}, then value of 'g' at height R_e from the surface of earth will be: (1)
A.1 ms^{-2} B. 2.5 ms^{-2} C. 4.5 ms^{-2} D.10 ms^{-2}

Q 16. Which of the following is not a unit of energy? (1)
A. joule B. newton metre C.kilowatt D.kilowatt hour

Q. no 17 to 20 are Assertion - Reasoning based questions. These consist of two statements – Assertion (A) and Reason (R).
Answer these questions selecting the appropriate option given below:
(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true and R is not the correct explanation of A
(c) A is true but R is false
(d) A is False but R is true

Q 17. **Assertion (A):** Work done by a force cannot be zero. (1)
Reason (R) : A raised hammer possesses potential energy due to its height.

Q 18. **Assertion (A):** Steam is a mixture. (1)
Reason (R) : In a compound, the composition of the elements must be fixed.

Q 19. **Assertion (A):** Epithelial tissue forms protective layers on body surfaces. (1)
Reason (R) : Epithelial cells are tightly packed with little intercellular space.

Q 20. **Assertion (A):** Mitochondria and chloroplasts are semiautonomous organelles. (1)
Reason (R) : They are formed by division of pre-existing organelles and contain DNA but lack protein synthesizing machinery.

SECTION – B

Q. no. 21 to 26 are very short answer questions.

Q 21. What are the advantages of intercropping over monoculture? Provide at least two benefits. (2)

Q 22. You are conducting an experiment in the lab using two beakers. Beaker A contains a saltwater solution while Beaker B contains pure water. You place two potato slices (one raw and one boiled potato slice) in each beaker. Describe what will happen to the potato slices in each beaker after a few hours. Explain your reasoning. (2)

Q 23. Differentiate between mitosis and meiosis. (2)

OR

Differentiate between rough and smooth endoplasmic reticulum. How is the endoplasmic reticulum important for membrane biogenesis?

Q 24. A student dissolves a large quantity of sugar in water and notices that after some time, sugar starts to settle at the bottom. What does this indicate about the nature of the solution? Explain how temperature and solubility play a role in this observation. (2)

Q 25. A hockey puck slides on a frictionless ice surface at a constant speed. Suddenly, a small rough patch causes it to slow down slightly. Explain what this tells us about the relationship between force and motion in terms of Newton's first law. (2)

Assume that the ice surface is 10,000 km long, explain the motion of the puck based on first law of motion, given that circumference of the Earth is 40,000 km.

OR

A swimmer pushes against the wall of a pool to start swimming forward. Analyze how Newton's third law of motion helps explain how the swimmer is able to move forward through water.

If the wall of the swimming pool was made of rubber, what difference would it make?

Q 26. Work done by the gravitational force on an object moved on a horizontal path is zero. Give reason. (2)

SECTION - C

Q.no. 27 to 33 are short answer questions.

Q 27. A car is moving on a straight road with a uniform acceleration. The following table gives the speed of the car at various intervals of time. (3)

Time (s)	0	10	20	30	40	50
Speed (ms^{-1})	5	10	15	20	25	30

A. Draw the shape of speed-time graph representing the above set of observations. What do you infer from the graph.

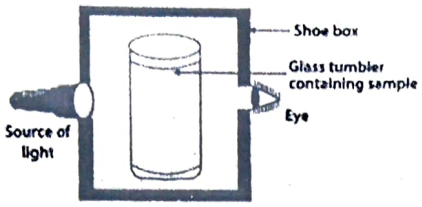
B. Find the acceleration of the car from the graph.

Q 28. An ice cube is placed gently on the surface of water in a glass so that when the ice floats, water comes up to the brim of the glass. What will happen to the level of water when the ice melts? Will it overflow? Give reason. (3)

Q 29. A.Define free fall. (3)

B. Identical packets are dropped from two aeroplanes—one above the equator and other above the north pole, both at height h. Assuming all conditions to be identical, will those packets take same time to reach the surface of earth? Justify your answer.

Q 30. A group of students took an old shoe box and covered it with a black paper from all sides. They fixed a source of light (a torch) at one end of the box by making a hole in it and made another hole on the other side to view the light. They placed a milk sample contained in a beaker/tumbler in the box as shown in the figure. They were amazed to see that milk taken in the tumbler was illuminated. They tried the same activity by taking a salt solution but found that light simply passed through it. (3)



(a) Explain why the milk sample was illuminated. Name the phenomenon involved.

(b) Same results were not observed with a salt solution. Explain.

(c) Starch was added to the milk and the sample was placed in the tumbler. How will the observation differ from (a)?

Q 31. During a hot summer day, a person decides to fill three separate cups with the same amount of cold water. One cup is placed outside in direct sunlight, another is placed indoors in a shaded area, and the last one is placed in a refrigerator. (3)

a) After a few hours, compare the temperatures and evaporation levels of the water in each cup. Which cup would likely have the highest temperature, and why?

b) If the cup's capacity is 100ml, and the rate of evaporation in shaded area is 1ml/minute, after how much time will the cup kept in sunlight dry up, assuming the rate of evaporation is double that of the cup kept in shade?

OR

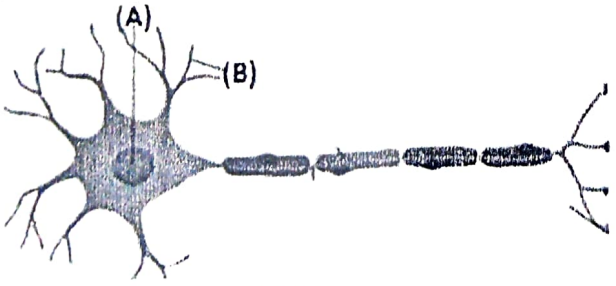
Change the following temperatures accordingly.

(a) -173°C to Kelvin

(b) 250 K to Celsius

(c) 2°C to Fahrenheit

Q 32. Imagine you are a scientist observing how animals respond to different stimuli in their environment. (3)



a) Look at the diagram of a human nerve cell. Identify and label the parts marked (A) and (B).
b) Explain how nervous tissue helps animals quickly react to changes around them.
c) List all the parts of the human body that are made up of nervous tissue.

Q 33. Evaluate the differences between plant and animal cells. Identify at least 2 organelles/ structures that are present in plant cells but absent in animal cells. Why do animal cells lack cell walls, even though organisms like earthworms don't have an external skeleton? (3)

cell wall
chloroplast

SECTION – D

Q.no. 34 to 36 are Long answer questions.

(5)

Q 34.

a) Identify A in the given figure. What role does this part play in the plant's growth?
b) Which meristematic is present at the growing tips of stems and roots? How does this tissue contribute to the plant's overall growth?
c) List and explain some properties of cells in meristematic tissue. How do these properties enable the plant to grow and adapt?

OR

a) Explain the three types of muscular tissues. Include their structure, location, function, labelled diagrams and whether they are under voluntary or involuntary control.
b) Are the muscles in your face under voluntary or involuntary control?

Q 35. a) The formula of the oxide of a metal Y is Y_2O_3. Determine the formula of its: (5)

(i) hydroxide (ii) carbonate (iii) nitride (iv) chloride

OH^- CO_3

b) Distinguish between 4P and P_4.

c) Identify the diatomic and triatomic molecules from the following: N_2, SO_2 , CO, HNO_3, N_2O, $CaCO_3$

OR

i) Calculate the molecular mass of the following:

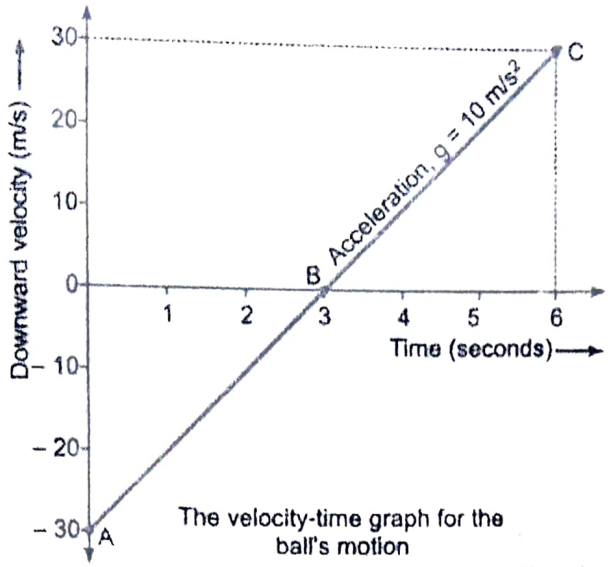
a) H_2O_2 b) C_4H_{10} c) Fe_2O_3

Atomic masses: H = 1u, C = 12u, O = 16u, Fe = 56u

ii)Write the chemical formula of the following-

a) Zinc nitrate b) Calcium sulphate c) Copper(II) oxide d) Sodium phosphate

Q 36. A. Velocity-time graph for the ball's motion is shown in figure. Observe the graph and answer the following questions. (5)



The velocity-time graph for the ball's motion

Assume that g = 10 m/s2 and that there is no air resistance.

(i) In which direction is the ball moving at point C?

(ii) At which point is the ball stationary?

(iii) At which point is the ball at its maximum height?

(iv) What is the ball's acceleration at point C?

(v) What is the ball's acceleration at point A?

(vi) At which point does the ball have the same speed as when it was thrown?

B. A stone weighing 100g, moving at 1.2ms-1hits a rigid wall normally and bounces back with the same speed. If the stone remained in contact with the wall for 1 millisecond only, find the average force exerted by the wall on the stone.

OR

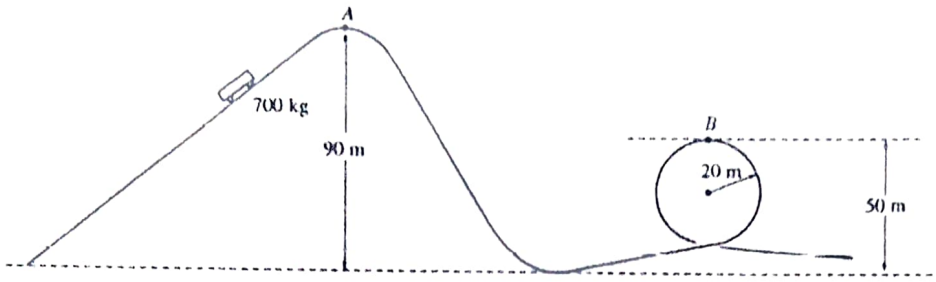
A. Mass of a car moving at 90kmh-1 is 800kg. Brakes are applied to bring the car to rest. If a retarding force of 4000N acts on the car, find the time taken by the car to come to rest. What distance will the car cover after the application of brakes?

B. A box weighing 40kg rests on a rough horizontal surface. When a force of 140N is applied on the box, it acquires a speed of 4ms-1 in 2s. Find the value of force of friction acting on the box due to the rough surface.

SECTION - E

Q.no. 37 to 39 are case - based/data -based questions with 2 to 3 short sub - parts. Internal choice is provided in one of these sub-parts.

Q 37. A roller coaster ride at an amusement park lifts a car of mass 700kg at a height of 90m above the lowest point on the track, as shown below. **(4)**



The car starts from rest at point A, rolls with negligible friction down the incline and follows the track around the loop of radius 20m. Point B-the highest point on the loop, is at a height of 50m above the lowest point on the track.

a) Indicate on the figure the point P at which maximum speed of the car is attained.

b) State the energy transformation that takes place as the car moves from Point A to Point B. (If need be, you may mark more points on the track to support your explanation)

c) Calculate speed of the car at point B.

OR

c) Calculate value of speed at point P.

Q 38. Read the following text carefully and answer the questions that follow: **(4)**

A farmer has grown wheat on his field consecutively two times but when the third time he grows wheat on the same field, the quality of the wheat was not up to the desired level. To improve the quality of his crops, he uses chemical fertilizer but the condition of the crop became worse. One of his friends told him to grow a different variety of crops after wheat so as to grow two or three crops in a year with good harvests and use biological manure in place of chemical fertilizers which he prepares by animal excreta and plant waste to get the good quality of crops. He also told him about the good storage of his grains to protect them from the biotic and abiotic losses as in agriculture storage losses are very high.

a) What do you think is different in the third time wheat crop?
b) What is the advantage of using biological manure over chemical fertilizers?
c) Is it possible for the farmer to grow two crops at the same time? If yes, what is the requirement?

OR

c) Enlist the biotic and abiotic losses.

(4)

Q 30. Read the passage given below and answer the following questions

According to Dalton's atomic theory, all matter whether an element, a compound or a mixture is composed of small particles called atoms which can neither be created nor destroyed during a chemical reaction. Dalton's theory provides a simple explanation for the laws of chemical combination. He used his theory to explain law of conservation of masses, law of constant proportions and law of multiple proportions, based on various postulates of the theory. Dalton was the first scientist to use the symbols for the elements in a very specific sense. When he used a symbol for an element he also meant a definite quantity of that element, that is one atom of that element.

a) State Dalton's postulate which is in accordance with law of constant proportion.

When 5 g calcium is burnt in 2 g oxygen, 7 g of calcium oxide is produced. When 5 g of calcium is burnt in 20 g of oxygen, then also 7 g of calcium oxide is produced. Why?

b) Calculate the percentage of carbon in CO_2 and CH_4.

OR

b) One of Dalton's postulates was - Atoms of different elements are different. As per this, Are Diamond, Graphite and Coal different elements? Explain.

atoms