

St. Paul's School
Class IX Half Yearly Examination (2024-25)
Science (086)

Max. Marks: 80

Time: 3 hrs

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. Answer to these questions should be in the range of 80 to 120 words.
- vii. 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

- C1.** On converting 308 K, 329 K, and 391 K to Celsius scale, the correct sequence of temperatures will be: **1**
- X**
- (a) 33°C, 56°C and 118°C
 - (b) 35°C, 56°C and 119°C
 - (c) 35°C, 56°C and 118°C
 - (d) 56°C, 119°C and 35°C
- C2.** Brass is a mixture of approximately. **1**
- (a) 30% zinc and 70% copper
 - (b) 70% zinc and 30% copper
 - (c) 20% zinc and 80% copper
 - (d) 50% zinc and 50% copper
- C3.** Select the following which has the highest kinetic energy. **1**
- X**
- (a) Particles of water at 0°C
 - (b) Particles of ice at 0°C
 - (c) Particles of steam at 100°C
 - (d) Particles of water at 100°C

C4. Aerated drinks like soda water are examples of

- (a) gas in liquid solutions
- (b) liquid in liquid solutions.
- (c) solid in liquid solutions
- (d) both (a) and (b)

1

C5. Select the following that does not affect the rate of evaporation.

- (a) Temperature
- (b) Surface area.
- (c) Wind speed
- (d) Insoluble heavy impurities.

1

C6. ----- and ----- are two elements found in the liquid state at room temperature.

- (a) Mercury and Bromine
- (b) Mercury and Sodium
- (c) Bromine and Fluorine
- (d) Sodium and Potassium

1

C7. ----- elements are in gaseous state at room temperature.

- (a) 100
- (b) 11
- (c) 51
- (d) 21

1

B8. The outer membrane of vacuoles is known as –

- X (a) Tonoplast
- (b) Apoplast
- (c) Cell wall
- (d) Nuclear membrane

1

B9. Girth of stem increases due to –

- (a) Apical meristem
- (b) Vertical meristem
- (c) Intercalary meristem
- (d) Lateral meristem

1

B10. Cork cells are impervious to water and gases by the presence of –

- (a) Cellulose
- (b) Lipids
- (c) Suberin
- (d) Lignin

1

B11. The undefined nuclear region of prokaryotes are also known as –

- (a) Nucleus
- (b) Nucleolus
- (c) Nucleic acid
- (d) Nucleoid

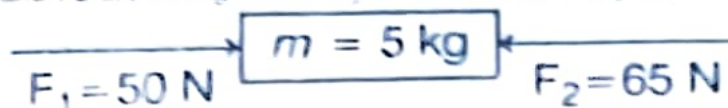
1

Water lily floats on water due to the presence of –

- (a) Collenchyma
- (b) Aerenchyma

- (c) Chlorenchyma
(d) Sclerenchyma

P13. Two forces F_1 and F_2 are acting on a body as shown in the figure



then acceleration in the body is

- (a) 23 m/s^2
(b) 3 m/s^2
(c) 2 m/s^2
(d) 22 m/s^2

P14. As we go from poles to equator, the value of acceleration due to gravity _____

- (a) goes on decreasing
(b) goes on increasing
(c) remains constant
(d) either (a) or (b)

B15. The dead component of a phloem is –

- (a) Sieve tubes
(b) Phloem parenchyma
(c) Phloem fibres
(d) Companion cells

B16. The proteins and lipids essential for building the cell membrane are manufactured by –

- (a) Endoplasmic reticulum
(b) Mitochondria
(c) Lysosomes
(d) Nucleus

Q. no 17 to 20 are Assertion – Reasoning based questions.

These consists 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 the 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.

C17. **Assertion (A):** A gas can easily be compressed by applying pressure.

Reason(R): Since the inter-particle spaces between gases are very large, they can decrease by applying pressure.

B18. **Assertion:** Lysosomes are known as 'suicidal bags of the cell.'

Reason: They are kind of waste disposal system of a cell.

X Reason: Phloem is responsible for the transfer of food in plants.

SECTION – B

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

- C21. A solution contains 15 g of common salt in 350 g of water. Calculate the concentration in terms of the mass-by-mass percentage of the solution. 2
X
- B22. 'Mitosis and Meiosis have different functions to serve in an organism.' Justify. 2
X
- B23. Which cell organelle is responsible for providing turgidity and rigidity to the plant cell? What role does this organelle play in unicellular organisms such as *Amoeba*? 2
X

OR

State the cell theory and name the scientists who proposed it.

- P24. (a) Differentiate between g and G (any one point). 2
(b) Mass of an object is 40 kg, what is its weight on the earth? (Take $g=10 \text{ m/s}^2$)
- P25. The gravitational force between two objects is F . How will this force change when: 2
X
(a) the distance between them is reduced to half?
(b) The mass of one of the objects becomes five times?

OR

State the importance of the Universal law of Gravitation.

- B26. Draw a neat and labelled diagram to show the components of Phloem. 2
X

SECTION - C

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

- C27. Give reasons: 3
(a) A glass filled with ice has water droplets on its outer surface.
(b) Steam causes more severe burns than boiling water.
(c) The smell of perfume spreads in the room easily.

- C28. How are sol, solution, and suspension different from each other? (2 points) 3

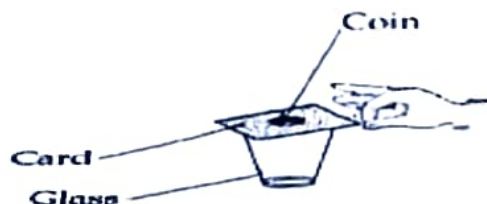
OR

Explain the following giving examples:

- (a) Saturated solution
- (b) Metalloid
- (c) Alloy

- B29. Explain meristematic tissues with reference to their location and function. 3
- B30. 'Plastids are the cell organelles that serve a prominent function in plants.' Highlight the types of plastids and compare them. 3
- P31. (a) State the Universal law of Gravitation. 3
- X(b) (b) Show that acceleration due to gravity of an object is independent of its mass.
- P32. (a) State newton's first law of motion. 3
- (b) Explain your answer with a reason: In which case the force of attraction will be larger?
- (i) Force of attraction of the earth on a body of mass 1kg.
 - (ii) Force of attraction of a body of mass 1 kg on the earth.

(c)



In the above experimental set-up, a student gives the card a sharp, fast horizontal flick with a finger.

- (i) What will happen to the coin?
- (ii) State reason for your answer.

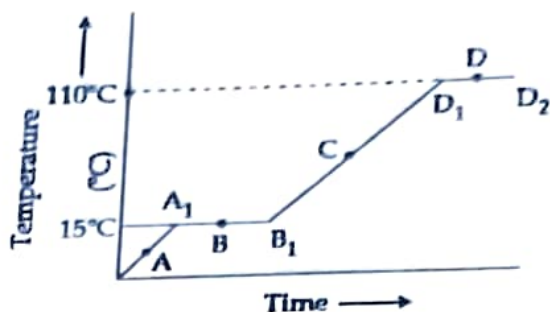
- P33. (a) Differentiate between acceleration and velocity. 3
- (b) Brakes are applied to a moving truck to produce retardation of 5 m/s^2 . If the time taken between application of brakes and the truck to stop is 2 seconds, calculate the distance travelled by the truck during this time.

SECTION - D

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

- C34. The temperature-time graph given below shows the heating curve for pure wax. From the graph answer the following: 5
- (a) What is the physical state of the substance at points A, B C, and D?
 - (b) What is the melting point of the substance?
 - (c) What is its boiling point?

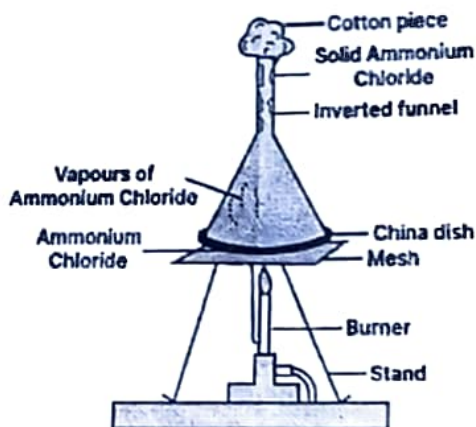
- (d) Which portion of the graph indicates that a change of state is taking place?
 (e) Name the terms used for heat absorbed during the change of states involved in the above processes.



OR

Answer the following questions based on the figure given below:

- What is sublimation?
- Name any two sublimates.
- Will you be able to separate the mixture of two sublimates by the process of sublimation? Explain.
- What is the role of temperature in this activity?
- Why is a cotton plug used to cover the mouth of an inverted funnel during this activity?



5. (a) If we sprinkle salt on cucumber slices, after sometime it releases water. What mechanism is responsible for this?
 (b) Differentiate between isotonic, hypotonic and hypertonic solutions.

5

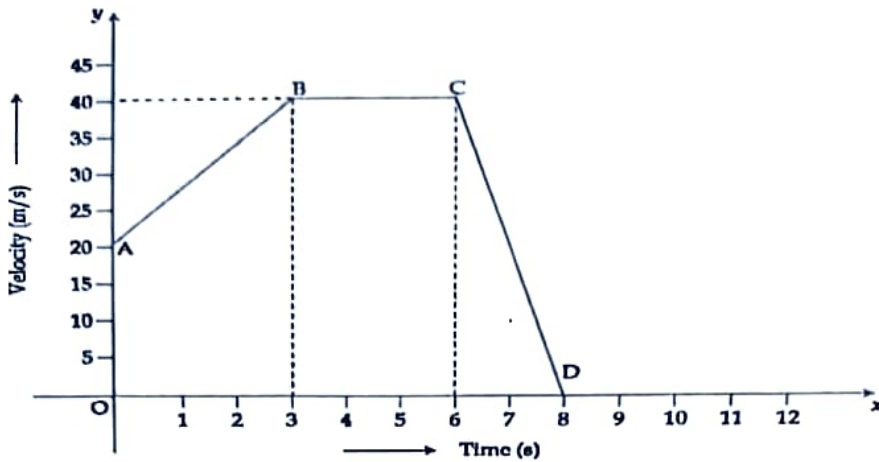
OR

Compare a plant cell and an animal cell. Support your answer with a neat and

labelled diagram of plant cell.

- P.36. X
- (a) When a stone tied to a thread is whirled around along a circular path, name the force which keeps the stone moving in the circular path. In which direction does this force act.
- (b) When is a body said to have uniform velocity?
- (c) The following is the velocity-time graph for a moving body.

5



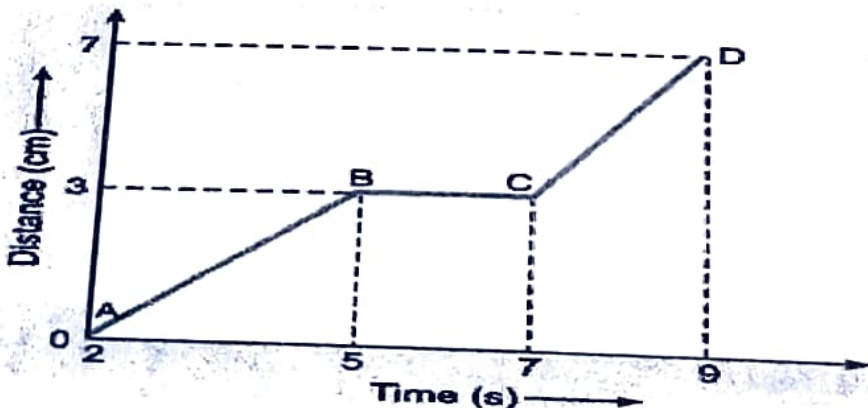
Find:

- (i) The velocity with which motion started.
- (ii) Acceleration acting on the body between A and B.
- (iii) Acceleration acting on the body between B and C.
- (iv) Distance travelled by the body from C to D.

OR

- (a) Define uniform circular motion.
- (b) The graph given below shows the positions of a body at different times. Calculate the speed of the body as it moves from

- (i) A to B
- (ii) B to C and
- (iii) C to D.



(c) Draw a speed versus time graph of a stone thrown vertically upwards and then coming downwards after attaining the maximum height

SECTION - E

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

C37. Read the passage given below and answer the questions that follow.

2
+

Atomic theory is a scientific theory that explains the nature of matter by proposing that all substances are composed of small, indivisible particles called atoms. The concept of the atom has evolved significantly over time, with contributions from many scientists. The modern atomic theory is rooted in several key ideas:

2
=
4

1. Early Concepts of the Atom

The idea of atoms dates back to ancient Greece, where philosophers like Democritus and Leucippus proposed that matter was made up of tiny, indivisible particles called "atomos," meaning "uncuttable." However, this idea was purely philosophical and lacked experimental evidence.

2. Dalton's Atomic Theory

The modern atomic theory was first formally introduced by John Dalton in the early 19th century. Dalton's theory, published in 1808, laid the groundwork for our understanding of atomic structure.

3. Advancements in Atomic Theory

As scientific knowledge advanced, Dalton's model was refined:

Discovery of Subatomic Particles: Experiments in the late 19th and early 20th centuries revealed that atoms are not indivisible. J.J. Thomson discovered the electron in 1897, leading to the understanding that atoms have internal structures. Later, Ernest Rutherford's gold foil experiment in 1911 demonstrated that atoms have a dense, positively charged nucleus.

Bohr's Model: Niels Bohr, in 1913, proposed that electrons orbit the nucleus in specific energy levels, introducing the concept of quantized energy states.

Quantum Mechanical Model: The current understanding of atomic structure is based on quantum mechanics. This model, developed in the 20th century by scientists like Schrödinger and Heisenberg, describes the atom in terms of probabilities, where

electrons occupy regions of space called orbitals, rather than fixed orbits.

4. Atomic Theory Today

Modern atomic theory incorporates the ideas of subatomic particles (protons, neutrons, and electrons), the nucleus, and quantum mechanics. It explains not only the structure of atoms but also the behaviour of elements in chemical reactions, the formation of molecules, and the properties of matter at the atomic level.

- (a) Write any two postulates of Dalton's atomic theory.
- X(b) (b) Hydrogen and oxygen combine in the ratio of 1:8 by mass to form water. What mass of oxygen gas would be required to react completely with 5 g of hydrogen gas?

OR

- (b) Explain the law of conservation of mass with example.

- B38. Plants and animals have different types of tissues because of differences in their organisation, growth patterns, locomotion etc. Plant tissues are of two types: meristematic and permanent tissues. Meristematic tissues are also known as growing tissues since they contribute to the growth of the plant both in length and girth. Permanent tissues are derived from the former cells which have lost the ability to divide. 4
- (a) Define tissues.
- (b) State any two properties of meristematic cells.
- (c) Name the substances that cause thickening in collenchyma and sclerenchyma.

OR

- (c) Write the functions of specialised types of parenchyma cells.

- P39. While catching a fast-moving cricket ball, a fielder in the ground gradually pulls his hands backwards with the moving ball. In doing so, the fielder increases the time during which the high velocity of the moving ball decreases to zero. Thus, the acceleration of the ball is decreased and therefore the impact of a catching the fast-moving ball (see figure) is also reduced. 1
- If the ball is stopped suddenly then its high velocity decreases to zero in a very short interval of time. Thus, the rate of change of momentum of the ball will be large. +
- Therefore, a large force would have to be applied for holding the catch that may hurt the palm of the fielder. 1
- +
- 2
- =
- 4



- (a) Define the term balanced force.
- (b) Which of the following has more inertia - a hollow plastic ball and a stone of the same size. Give reason for your answer.
- X(c) (c) After stating the newton's second law of motion, establish the relation $F = ma$.

OR

- X(c) (c) State Newton's second law of motion. Give its mathematical expression and hence define the unit of force.