1st PERIODIC ASSESSEMENT - 2025-26
CLASS – IX
SUBJECT – SCIENCE

Time: 90 Min Full Marks – 40

Student's Name…….

Roll. No. - ……

General Instructions:

The Question paper is divided into two parts:
Detail Assessment – 10 marks
Descriptive/Subjective type of questions – 30 marks

This question paper consists of 11 questions in 3 sections.

1. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
2. Section A consists of 4 questions carrying 1 mark each.
3. Section B consists of 5 questions carrying 2 marks each.
4. Section C consists of 4 Long Answer type questions carrying 04 marks each.

SECTION A - Class 9 Science PA1 Class Test Exam Paper 2025

Q.1 Give reasons: We can easily move our hand in air but to do the same through a solid block of wood we need a karate expert.
Answer: Air is a gas and has loosely packed particles, offering very little resistance to motion. A solid block of wood has tightly packed particles and resists movement, requiring more force to break or pass through—hence, a karate expert is needed.

Q.2 Suggest a method to liquefy atmospheric gases?
Answer: Atmospheric gases can be liquefied by **cooling them** and **increasing the pressure**.

Q.3 Convert 293 K temperature to the Celsius scale.
Answer:
°C = K − 273
= 293 − 273 = **20°C**

Q.4 State one difference between evaporation and boiling.
Answer:

- **Evaporation** occurs at all temperatures from the surface.
- **Boiling** occurs at a fixed temperature throughout the liquid.

OR

What is the unit of measurement for speed?
Answer: The SI unit of speed is **metres per second (m/s)**.

Section B (2 Marks each) - Class 9 Science PA1 Class Test Exam Paper 2025

Q.5 Give reason for the following observations.
(a) Naphthalene balls disappear with time without leaving any solid.
Answer: Naphthalene undergoes **sublimation**, which means it changes directly from solid to gas without becoming a liquid.

(b) We can get the smell of perfume sitting several metres away.
Answer: Perfume particles spread through the air by **diffusion**, which is the movement of particles from an area of high concentration to an area of low concentration.

OR

What is the effect of heat on the state of matter? Describe how heating causes a change in state using water as an example.
Answer: Heat increases the kinetic energy of particles, reducing the force of attraction between them. In water, heating causes it to change from liquid to steam (gas) when it reaches 100°C, demonstrating a change in state due to added heat.

Q.6 Name the three main components of the cell. Briefly describe the function of two of them.
Answer:
The three main components of a cell are:

1. **Cell membrane**
2. **Cytoplasm**
3. **Nucleus**

Functions:

1. **Cell Membrane:**
   The cell membrane is a thin, flexible outer layer that surrounds the cell. It is **selectively permeable**, which means it allows only certain substances to enter or leave the cell. It protects the internal contents of the cell and helps maintain the cell's shape and stability. It also plays a key role in communication with other cells.
2. **Nucleus:**
   The nucleus is often called the **control center** of the cell. It contains the cell's **genetic material (DNA)**, which carries instructions for making proteins and controlling the cell's activities such as growth, metabolism, and reproduction. The nucleus is surrounded by a nuclear membrane and also contains a small dense body called the **nucleolus**, which helps in the formation of ribosomes.

Q.7 How do substances like CO_2 and water move in and out of the cell? Discuss.
Answer: Substances like **carbon dioxide (CO_2)** and **water** move in and out of the cell through the **cell membrane** by **diffusion** and **osmosis**, respectively.

- **Carbon dioxide** moves by **diffusion**, which is the movement of particles from an area of higher concentration to an area of lower concentration. For example, CO_2 produced inside the cell as a waste product diffuses out into the surrounding environment.

- **Water** moves by **osmosis**, which is a special type of diffusion where water molecules move across a selectively permeable membrane from an area of higher water concentration to an area of lower water concentration.

These are **passive transport** processes, meaning they do **not require energy** from the cell.

Q.8 A driver of a car travelling at 52 km/h applies the brakes and stops in 5 s. Another driver at 34 km/h stops in 10 s. Plot speed vs. time graphs and find which car travelled farther.
Answer:
First, convert speeds:

- Car A: 52 km/h = 14.44 m/s
- Car B: 34 km/h = 9.44 m/s

Calculate distance (area under the speed-time graph):

- Car A: ½ × 14.44 × 5 = **36.1 m**
- Car B: ½ × 9.44 × 10 = **47.2 m**

Conclusion: Car **B** travelled farther after brakes were applied.

Q.9 What is meant by the term 'diffusion'? Give an example. Define and explain the term "latent heat" in relation to phase changes.
Answer:

- **Diffusion** is the movement of particles from a region of higher concentration to lower concentration.
  Example: Smell of food spreading in a room.
- **Latent heat** is the amount of heat energy required to change the state of a substance without changing its temperature, e.g., melting ice or boiling water.

Section C (4 Marks each) - Class 9 Science PA1 Class Test Exam Paper 2025

Q.10 (a) A farmer moves along the boundary of a square field of side 10 m in 40 s. What is the displacement after 2 minutes 20 seconds?
Answer:
Perimeter of field = 4 × 10 = 40 m
1 round = 40 s
Total time = 140 s
Rounds = 140 ÷ 40 = 3.5 rounds

After 3.5 rounds, the farmer is diagonally opposite to the starting point (half of a diagonal).
Displacement = Diagonal ÷ 2 = $(\sqrt{(10^2 + 10^2)}) \div 2 = \sqrt{200} \div 2 \approx$ **7.07 m**

Q.11 (a) What is the significance of the plasma membrane in a cell?
Answer: The **plasma membrane** is important because it acts as a **selectively permeable barrier**, controlling what enters and exits the cell.

It helps maintain the cell's **internal environment**, provides **protection and shape**, and allows the cell to **communicate** with its surroundings. It also supports the transport of nutrients and waste, keeping the cell functioning properly.

(b) Write a short note on the structure and function of the nucleus.
Answer:

- **Structure:** Surrounded by a double membrane, contains nucleoplasm, chromatin, and nucleolus.
- **Function:** It controls cell activities, stores genetic information (DNA), and plays a vital role in reproduction and protein synthesis.

Q.12 (a) A stone is thrown vertically upwards with a velocity of 5 m/s. What will be the height attained and time to reach there? (Acceleration = 10 m/s²)
Answer:
Given: u = 5 m/s, a = –10 m/s², v = 0 (at top)

Use:
$v^2 = u^2 + 2as \rightarrow 0 = (5)^2 + 2(-10)s$
s = 25 ÷ 20 = **1.25 m**

Time to reach top:
v = u + at → 0 = 5 – 10t → t = **0.5 s**

Q.13 Q.**13 Carry out the following osmosis experiment:**
Take four peeled potato halves and scoop each one out to make potato cups, one of these potato cups should be made from a boiled potato. Put each potato cup in a trough containing water.
Now,

(a) Keep cup A empty
(b) Put one teaspoon sugar in cup B
(c) Put one teaspoon salt in cup C '
(d) Put one teaspoon sugar in the boiled potato cup D
Keep these for two hours. Then observe the four potato cups and answer the following:
(i) Explain why water gathers in the hollowed portion of B and C.
(ii) Why is potato A necessary for this experiment?
(iii) Explain why water does not gather in the hollowed out portions of A and D.

OR

A student performs an experiment to observe the effect of temperature on the rate of evaporation. She places three beakers of equal size, each containing 100 mL of water. The three beakers are kept in different environments:

- **Beaker 1: At room temperature (25°C)**
- **Beaker 2: In a refrigerator (5°C)**
- **Beaker 3: On a heated surface (45°C)**

After 30 minutes, she observes that the water in Beaker 3 has evaporated the most, followed by Beaker 1, while Beaker 2 still has almost the same amount of water as before.

Questions:

(a) Based on the given experiment, explain how temperature affects the rate of evaporation.
(b) Why do you think the rate of evaporation is the highest in Beaker 3?
(c) What conclusion can be drawn from this experiment about the relationship between temperature and evaporation?

Ans:

Osmosis experiment using potato cups.

Setup:

- A = empty
- B = 1 tsp sugar
- C = 1 tsp salt
- D = 1 tsp sugar in boiled potato
  (All placed in water for 2 hours)

(i) Why does water gather in B and C?
Answer: Water moves into cups B and C by **osmosis** due to the higher concentration of solutes inside the cups.

(ii) Why is potato A necessary for this experiment?
Answer: It acts as a **control** to show that no water enters when there's no solute difference.

(iii) Why does water not gather in A and D?
Answer:

- In A: No solute → no osmotic gradient.
- In D: Boiled potato cells are **dead**, so no functional membrane → no osmosis.

OR:

Temperature and evaporation experiment

(a) How does temperature affect evaporation?
Answer: Higher temperature increases the kinetic energy of water molecules, which helps them escape faster, increasing the evaporation rate.

(b) Why is evaporation highest in Beaker 3?
Answer: Beaker 3 is on a heated surface (45°C), giving water molecules more energy to evaporate quickly.

(c) What conclusion can be drawn?

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