

The Mother's International School
Mid-Term Examination (2024-25)

Devanshi Bahadur
9-C
Roll no - 6

Class: IX

Subject: Science

Date: 9th September 2024

Max. Marks: 80

Time Allowed: 3 hours

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

- Q.1. The forces of attraction between particles are minimum in – 1
(a) sugar (b) salt (c) water (d) oxygen
- Q.2. A few substances are arranged in the increasing order of density. Which of the following represents a correct arrangement? 1
(a) oil, water, air (b) air, oil, water.
(c) water, oil, air (d) water, air, oil
- Q.3. Which of the following is an example of a physical change? 1
(a) Burning of wood (b) Rusting of iron
(c) Dissolving sugar in water (d) Digesting food
- Q.4. Which among the following substances is sublimable: 1
(a) Chlorine (b) Bromine
(c) Fluorine (d) Iodine.
- Q.5. Air and Water are: 1
(a) both mixtures (b) both are compounds
(c) mixture and compound respectively. (d) compound and mixture respectively

Q.6. An alloy is an example of:

- (a) A compound
- (c) A heterogeneous mixture

- (b) A homogeneous mixture
- (d) A pure substance

Q.7. The physical process shown in the picture of a leaf is:



- (a) Evaporation
- (c) Precipitation

- (b) Condensation
- (d) Sublimation

Q.8. The Phenomenon which helps freshwater unicellular organisms (e.g., Amoeba) continuously gain water in their bodies.

- (a) Osmosis
- (b) Diffusion
- (c) Pinocytosis
- (d) Phagocytosis

Q.9. Lysosome arise from

- (a) Endoplasmic reticulum
- (c) Plastids

- (b) Golgi apparatus
- (d) Mitochondria

Q.10. Which of the following statements best distinguishes prokaryotic cells from eukaryotic cells?

- (a) Prokaryotic cells contain a well-defined nucleus, while eukaryotic cells do not.
- (b) Eukaryotic cells have membrane-bound organelles, while prokaryotic cells do not.
- (c) Prokaryotic cells have mitochondria, while eukaryotic cells do not.
- (d) Eukaryotic cells lack ribosomes, which are present in prokaryotic cells.

*Q.11. What would happen if the apical meristem of a plant is damaged?

- (a) The plant will grow taller but not wider.
- (b) Lateral branches will grow more vigorously.
- (c) The plant will stop all types of growth.
- (d) The plant will develop new roots instead of shoots.

Q.12 Which of the following functions is NOT served by stomata in plants?

1

- (a) Exchange of gases, particularly CO_2 and O_2 , with the atmosphere
- (b) Loss of water in the form of vapour during transpiration
- (c) Creating pressure for water to rise upward by transpiration
- (d) Helping leaves carry out the process of photosynthesis

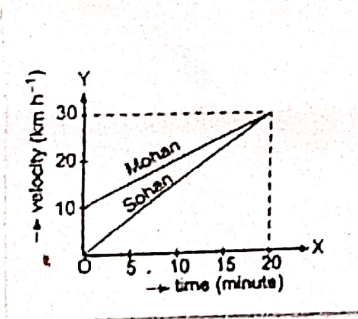
Q.13. The same net force is applied to object A and B. The observed accelerations of the two objects are not the same. Object A has an acceleration three times that of object B. Which of the following is correct?

1

- (a) Object A has three times the mass of object B.
- (b) Object A has one-third mass of object B.
- (c) Object A has a different, less streamlined shape than object B.
- (d) Object A has more friction than object B.

Q.14. Velocity-time graphs for two auto drivers Mohan and Sohan are shown in the adjoining figure. Then during 20 minutes of driving

1



- (a) Displacement of Mohan is more than Sohan.
- (b) Displacement of both Mohan and Sohan is equal
- (c) Displacement of Sohan is more than Mohan.
- (d) Displacement of Sohan and Mohan is zero.

Q.15 Which of the following statements are TRUE about Sclerenchyma?

1

- i. Sclerenchyma cells are dead at maturity and provide mechanical support.
- ii. Sclerenchyma cells are responsible for the transport of water and nutrients.
- iii. Sclerenchyma tissues are composed of cells with thick, lignified walls.
- iv. Sclerenchyma cells are actively involved in cell division.

(a) i and ii

(b) ii and iii

(c) i and iii

(d) iii and iv

Q.16. In an experiment, some dried raisins are left in plain water for some time followed by putting them into a concentrated solution of sugar. What would be the observations? 1

- (a) Raisins shrink in plain water, but swell up when placed in the concentrated sugar solution
- (b) Raisins will remain the same in size in plain water, but shrink when placed in the concentrated sugar solution
- (c) Raisins will swell when placed in plain water, but shrink when placed in the concentrated sugar solution
- (d) Raisins will remain the same in size in plain water, but swell when placed in the concentrated sugar solution

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): Steam is better than boiling water for heating purposes. 1
Reason (R) : Steam contains more heat in the form of latent heat than boiling water.

Q.18 Assertion (A): The primary function of xylem is to transport water from roots to leaves. 1
Reason (R): Xylem vessels are composed of living cells that facilitate the upward movement of water.

Q.19 Assertion(A):The value of acceleration due to gravity is maximum at the poles and minimum at the equator. 1
Reason(R): Radius of earth is least at equator and maximum along the polar plane

Q.20 Assertion (A): Meiosis is called reduction division. 1
Reason (R): Meiosis takes place in Pollen grain formation.

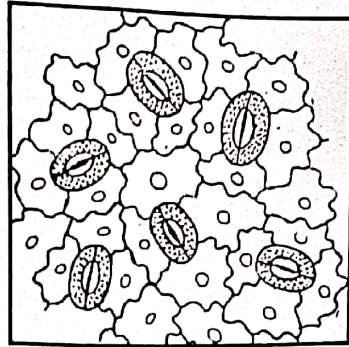
SECTION – B

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

Q.21. (a) Give one example each of (i) Gel (ii) Emulsion 2
(b) Which among the following is filterable and why?
(i) Sugar in water (ii) Chalk powder in water.

Q.22 Draw a neat and labelled diagram showing the structure of a Cell Nucleus showing all the sub-parts. 2

Q.23 (a) Name the tissue which is depicted in the given diagram? 2



(b) What substance in cork cells makes them impervious to gases?

(c) Why does chewing a pear and guava fruits provide a crunchy and granular feel? Explain

Q.24 If the time taken to bring a ball to rest from a certain velocity v is reduced to half, what will be the changes in the values of: 2

- (a) Initial and final momentum
- (b) Change of momentum
- (c) Rate of change of momentum

Q.25 A car moves with a speed of 30Km/hr for half an hour, 25Km/hr for one hour and 40 Km/hr for two hours. Calculate the average speed of the car. 2

OR

An athlete completes one round of a circular track of diameter 100 m in 20 s. What will be the displacement at the end of 1 minute and 10s?

Q.26 (a) Explain with the reason whether the force is balanced or unbalanced in the following situations: 2

- (i) In the game of tug of war, the two teams apply force but the rope does not move
- (ii) A ball rolling on the ground stops after sometime.

(b) Describe the effect of following forces acting on a moving object:

- (i) Force of gravity is less than air resistance
- (ii) Frictional force is equal to the mechanical push on an object

OR

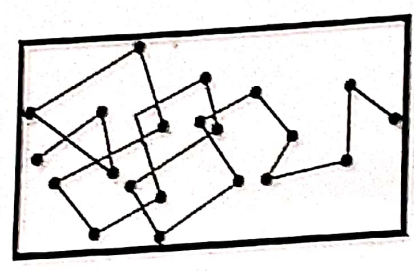
A constant force acts on an object of mass 5 kg for a duration of 2 sec. It increases the object's velocity from 3m/s to 7m/s. Find the magnitude of the applied force. Now if the force was applied for a duration of 5 sec, what would be the final velocity of the object?

SECTION - C

Q.no. 27 to 33 are short answer questions

Q.27. (a) Do you consider light as matter? Give reason for your answer.

(b) (i) Identify the property of particles of matter shown in the figure given below.
 (ii) Distinguish between solid, liquid and gas on the basis of this property



Q.28. (a) Based on which factor a solution is said to be diluted, concentrated or saturated? Explain

(b) How will you convert a saturated solution into an unsaturated solution?

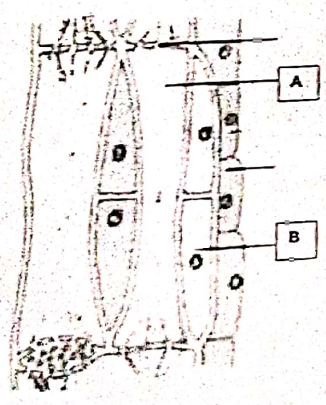
OR

(a) Which among the following will show the Tyndall effect and why?

- (i) Milk in water
- (ii) Ink in water

(b) State and explain any two properties of a true solution.

Q.29 (a) Identify the plant tissue shown in the given figure and state its function

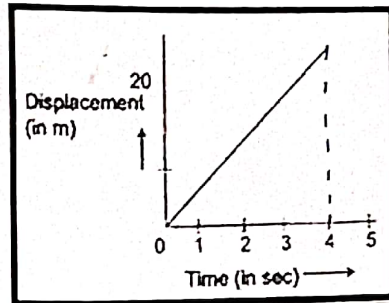


- (b) Label components A and B of this tissue.
- (c) Name the dead component of this tissue.

Q.30 (a) What happens when a living plant cell is placed in a hypertonic solution? Explain. 3

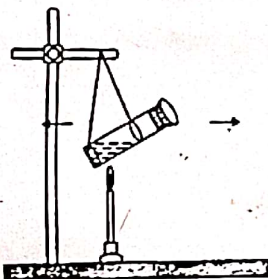
(b) State the composition of chromosomes. At which stage, chromosomes are visible as rod shaped structures?

Q.31 (a) The displacement-time graph of a moving particle is shown in the figure. How much force acts on the body? Give reason too. 3



(b) In oil tankers some space is left at the top while filling them. Apply Newton's Laws of motion to explain the answer.

(c) Take a test tube and pour a small amount of water in it. Seal its mouth with the help of a cork. Heat the test tube on a burner flame till all water turns into steam.



(i) What happens to the cork?

(ii) Why happens to the test tube?

(iii) The reason for the two {(i) & (ii)} observations?

Q.32. (a) How would you arrive at the mathematical formula to measure force using Newton's second law of motion? Also state Newton's second law of motion. 3

(b) Define the unit of force using the formula derived above.

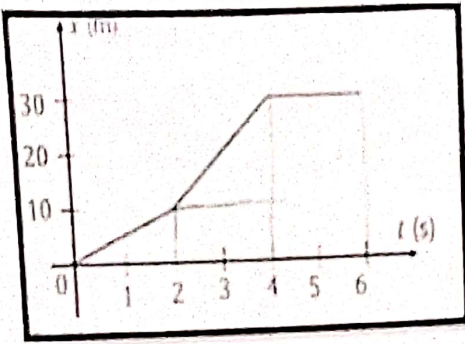
OR

A train starts from rest and moves with a constant acceleration of 2.0m/s^2 for half a minute. The brakes are then applied and the train comes to rest in one minute.

Find (a) the total distance moved by the train

(c) the maximum speed attained by the train.

Q.33



(a) The $x - t$ (position time graph) of an object moving in a straight line is shown. Calculate the average velocity in the time interval

(i) $t = 2$ to $t = 4$ s

(ii) $t = 4$ s to $t = 6$ s

(b) A particle moves over three quarters of a circle of radius r . What is the magnitude of its displacement?

SECTION - D

Q. no. 34 to 36 are Long answer questions

- Q.34. (a) Between boiling and evaporation, which is a bulk phenomenon and why? 5
(b) Define Latent heat of vapourisation.
(c) What will happen if dry ice is left in open at room temperature? Draw a neat and labelled diagram of the process involved the way it is carried out in the laboratory.

OR

- (a) Draw a well labelled diagram of the interconversion of states.
(b) Define melting point.
(c) Why does the temperature remain constant at melting point? Explain
(d) Give Reason: (attempt any one)
(i) Blowing on hot tea or coffee helps it cool down faster.
(ii) Eggs boil faster when salt is added to the water.

- Q.35 (a) Draw a neat and labelled diagram of Collenchyma. 5
(b) Explain how Collenchyma differs from Parenchyma in terms of intercellular spaces and cell wall structure?
(c) Differentiate between Rough Endoplasmic Reticulum and Smooth Endoplasmic Reticulum

OR

- (a) Draw a well labelled diagram showing different locations of meristematic tissue.
(b) State any two features of the cells present in meristematic tissue.
(c) Water hyacinth floats on the water surface. Explain giving the suitable reason.

- (a) State the universal law of gravitation.
- (b) Why is G called a universal constant?
- (c) What happens to the gravitational force between two objects if the masses of both objects are doubled and the distance between them is also doubled? Show the calculations.
- (d) The gravitational force between two objects is 100 N. How should the distance between the objects be changed so that the force between them becomes 50N?

OR

- (a) A ball is thrown vertically upwards and reaches a maximum height in 3 s.
Find :
(i) the velocity with which it was thrown upwards
(ii) the maximum height attained by the ball. (Take $g=10\text{m/s}^2$)
- (b) The motion of the moon around the Earth is along a circular path. Name the force that is responsible for this motion. What provides this force to the moon? What will happen if suddenly this force disappears
- (c) The value of 'g' on the surface of earth is 9.8m/s^2 . Suppose a planet exists whose mass and radius both are half the value of earth. Calculate acceleration due to gravity at the surface of the planet.

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 Case Study:Free Fall

4

An object that falls through a vacuum is subjected to only one external force, the gravitational force, expressed as the weight of the object. An object that is moving only because of the action of gravity is said to be free falling and its motion is described by Newton's second law of motion. With algebra we can solve for the acceleration of a free falling object. The weight, size, and shape of the object are not a factor in describing a free fall. In a vacuum, a beach ball falls with the same acceleration as an airliner. Knowing the acceleration, we can determine the velocity and location of any free falling object at any time using the following equations.

$$V = a t$$

$$X = \frac{1}{2} a t^2$$

where a is the acceleration, V is the velocity, and X is the displacement from an initial location. If the object falls through the atmosphere, there is an additional drag force acting on the object and the physics involved with describing the motion of the object is more complex.

Table

Here is a table of calculated velocity (meters per second), and displacement (meters) at 1 second intervals for a freely falling body:

Time (s)	0	1	2	3	4	5	6	7	8
Velocity (m/s)	0.0	9.8	19.6	29.4	39.2	49.0	58.8	68.6	78.4
Displacement (m)	0.0	4.9	19.6	44.1	78.4	122.5	176.4	240.1	313.6

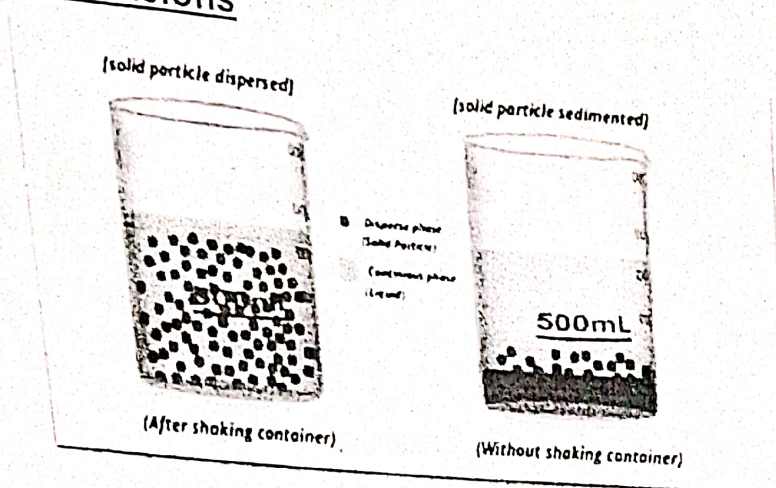
Answer the following questions:

- Observe the pattern of velocity in the table and describe the nature of motion of the freely falling object and also draw the shape of $v-t$ graph for this type of motion.
- Define acceleration due to gravity ' g '. What is the value of ' g ' at the center of the earth.
- 'The weight, size, and shape of the object are not a factor in describing a free fall'. Justify this statement mathematically by showing ' g ' doesn't depend upon the mass of the falling body.

OR

- From a cliff of 49 m high, a man drops a stone. Find the time taken by the stone to reach the ground. One second later, he throws another stone with some initial velocity U . The time taken by the second stone to reach the ground is one second less than that taken by the first stone as both the stones reach the ground at the same time. Find out the initial speed U with which he threw the second stone.

Q.38 Case Study : Suspensions



A suspension is a type of heterogeneous mixture where particles of one substance are dispersed throughout a fluid or gas. Unlike solutions, where solutes dissolve and become part of the solvent on a molecular level, suspended particles in a suspension are large enough to be visible to the naked eye and do not dissolve. Instead, they remain suspended temporarily in the medium due to the constant motion of the particles and the surrounding fluid. Over time, these particles settle out due to gravity, forming layers within the suspension. This characteristic separation distinguishes suspensions from colloids and solutions. Common examples include muddy water, where soil particles are suspended in water, or certain medicines that need to be shaken before use to redistribute the suspended particles evenly. Suspensions play a crucial role in various fields, from pharmaceuticals and cosmetics to environmental science.

- (a) Give any two examples of suspensions.
- (b) Explain the term 'heterogeneous mixture'.
- (c) Do the particles of a suspension show visual boundaries? Also explain and compare with colloidal mixture

OR

- (c) Differentiate between a suspension and a colloid on the basis of stability of particles. Explain your answer giving reason.

Q.39 Case Study: The Super-Charged Algae

Researchers discovered a species of algae in a remote ocean trench with remarkable photosynthetic efficiency. This algae's cells contained an unusually high number of chloroplasts and exhibited rapid cell division. The algae's cellular adaptations enable it to thrive in low-light conditions and survive extreme pressures.

- (a) Which type of cell division is most likely responsible for the rapid increase in the algae's cell numbers? How many daughter cells are produced as a result of this division?
- (b) Which cellular structure helps the algae withstand extreme pressures, and how does it help?
- (c) Name the organelle that contributes to photosynthesis. How does an increased number of this organelle enhance the algae's photosynthetic efficiency?

OR

- (c) Which organelle plays an important role in providing energy for cell division in algae? In which form is the energy stored in this organelle?

*****The End*****

