SUBJECT - SCIENCE

Duration: 3 hours **Maximum Marks: 80**

General Instructions:

1. The question paper comprises of 39 questions in all.
2. The question paper has 5 Sections.
3. Section–A has 20 questions of 1 mark each
4. Section–B has 6 questions of 2 marks each
5. Section–C has 7 questions of 3 marks each
6. Section- D has 3 questions of 5 marks each
7. Section- E has 3 questions for 4 marks.

SECTION A

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

Q.1 The table below shows the speed of a bus in three hours of its travel. What was the average speed of the bus?

	First hour	Second hour	Third hour
Speed of the bus	35 km/hr	60 km/hr	40 km/hr

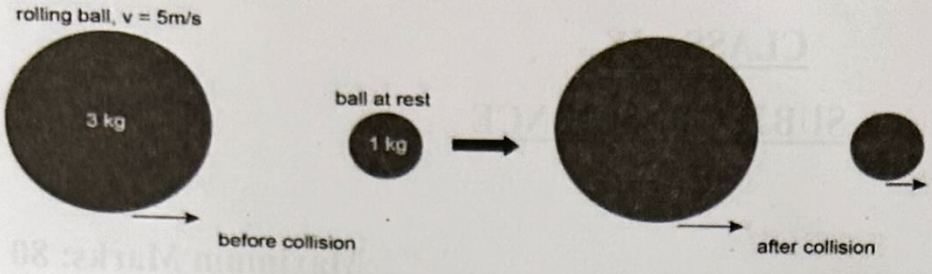
(a) 35 km/hr

(b) 40 km/hr

(c) 45 km/hr

(d) 60 km/hr

Q.2 A rolling ball of mass 3 kg strikes a smaller ball of mass 1 kg at rest. After collision, both the balls roll in the direction shown in the picture. What would happen if the smaller ball were rolling with a velocity of 5 m/s and struck the bigger ball at rest?



(a) The two balls would continue to roll in the direction of the strike.

(b) The smaller ball would rebound and the bigger ball would roll forward.

(c) The two balls would roll in the direction opposite to the strike.

(d) The smaller ball would stop rolling and the bigger ball would start rolling.

Q.3 Which of the following represent a balanced force?

(a) A boy sitting on a chair

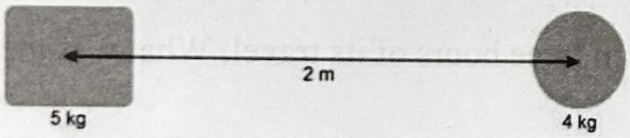
(b) An object sinking in water

(c) An apple falling from a tree

(d) A magnet attracting an iron nail

Q.4 Which pair of objects will have the strongest force of gravity between them?

(a)



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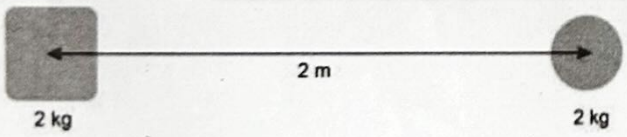

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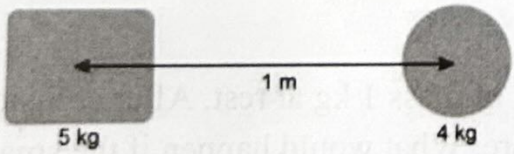

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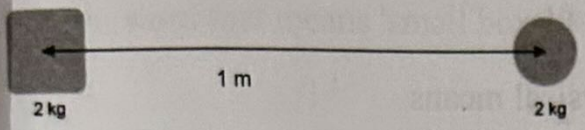


Q.5 Few characteristics of a quantity are given below. Choose the correct name of the quantity.

(i) It is zero at the centre of the earth.
(ii) It is measured by a spring balance.
(iii) It is a vector quantity.
(iv) Its direction is towards the centre of the earth.

a) Pressure (b) weight (c) mass (d) kilogram

Q.6 Choose the incorrect statement

(a) Low boiling liquids evaporate faster than high boiling liquids.

(b) Cooling is caused during boiling

(c) The normal room temperature is 298 K

(d) Evaporation is a surface phenomenon but boiling is not

Q.7 Which property of a gas helps to fill a large volume of liquified petroleum gas (LPG) in cylinders?

(a) High fluidity (b) Low density

(c) High inflammability (d) High compressibility

Q.8 Why do naphthalene balls disappear with time without leaving any solid behind?

(a) Due to melting (b) Due to freezing

(c) Due to boiling (d) Due to sublimation

Q.9 Which of the following property does not describe a compound?

(a) It is composed of two or more elements

(b) It is a pure substance.

(c) It cannot be separated into constituents by physical means

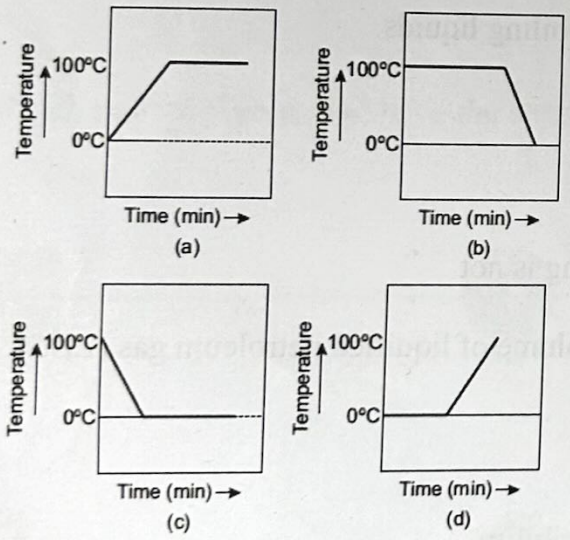
(d) It is mixed in any proportion by mass

Q.10 The continuous zig-zag movement of colloidal particles in a dispersion medium is called _____ .

(a) Dispersion (b) Tyndall effect

(c) Brownian movement (d) Oscillation

Q.11 A student heats a beaker containing ice and water. He measures the temperature of the content of the beaker as a function of time. Which figure represents the correct observation:



(a) a (b) b

(c) c (d) d

Q.12 The word 'cell' is derived from

(a) Greek word that means 'small box-like structure'

(b) Latin word that means 'a little room'

(c) Greek word that means 'a little room'

(d) Latin word that means 'small box-like structure'

Q.13 Match the following columns.

	Column I		Column II
A	Robert Hooke	1	Discovery of nucleus
B	Schleiden and Schwann	2	Protoplasm
C	Robert Brown	3	Cell Theory
D	Purkinje	4	Discovered Cell

(a) A-3, B-4, C-1, D-2
(b) A-1, B-2, C-3, D-4
(c) A-2, B-4, C-1, D-3
(d) A-4, B-3, C-1, D-2

Q.14 The shape and size of cells are related to

(a) Type of cell
(b) Function of cell
(c) Length of cell
(d) Both (a) and (b)

Q.15 Parenchyma cells are

(a) relatively unspecified and thin walled
(b) thick walled and specialised
(c) Lignified
(d) None of the above

Q.16 The permanent tissue, collenchyma provides ...(A)... and ...(B)... to plants.

(a) (A)-food, (B)-water
(b) (A)-flexibility, (B)-mechanical support

(c) (A)-buoyancy, (B)-support

(d) (A)-flexibility, (B)-buoyancy

Question No. 17 to 20 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)** - Uniform circular motion is an accelerated motion.

Reason (R) - In uniform circular motion magnitude of velocity is constant but direction of motion is continuously changing so that velocity is changing with time.

Q.18 **Assertion (A)** - A gas can be easily compressed by applying pressure.

Reason (R) - Since the inter-particle spaces in the gaseous state are very small, and cannot be decreased by applying pressure.

Q.19 **Assertion (A)** - Carbon dioxide and oxygen move across the cell membrane by diffusion process.

Reason (R) - Carbon dioxide and oxygen are important gases which are produced inside the body.

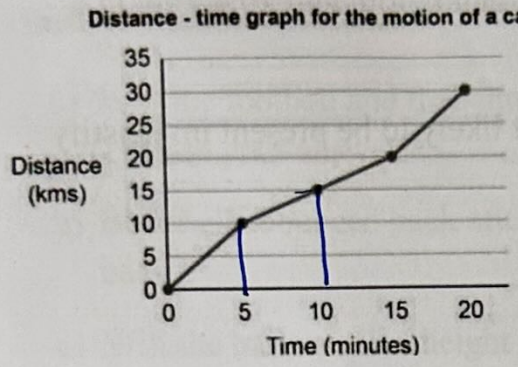
Q.20 **Assertion (A)** - Sclerenchyma tissue are long, narrow and thick walled

Reason (R) - Walls of these tissues are thickened because of presence of lignin

SECTION B

Question No. 21 to 26 are very short answer questions

Q.21 The graph below shows how the car travelled from house to school.



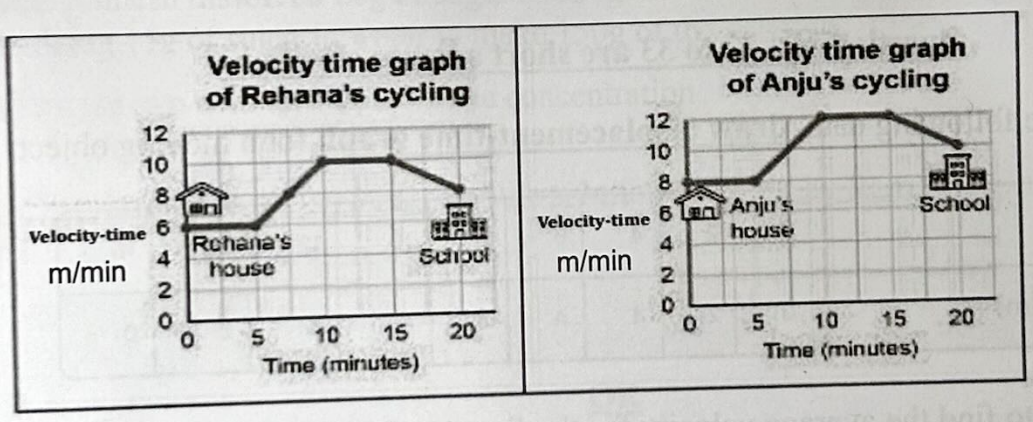
16-6

a) Did the car move with uniform motion from house to school?

b) What will be the speed of the car between 5 minutes and 10 minutes?

OR

Rehana and Anju stay at different places but study in the same school. The velocity-time graph shows how Rehana and Anju bicycled from house to school.



a) What was Rehana's maximum cycling velocity?

b) What can be concluded by comparing the velocity-time graphs of Rehana and Anju?

Q.22 Answer the following questions

(a) On heating, calcium carbonate gets converted into calcium oxide and carbon dioxide. Is this a physical or a chemical change? Give reason.

(b) Classify the following as chemical or physical changes-

1. Cutting of trees P
2. Rusting of almirah C

Q.23 An element is sonorous and highly ductile. Under which category would you classify this element? What other characteristics do you expect the element to possess?
metal lustrous, malleable,

Q.24 Diagrammatically show the condition of a plant cell before and after kept in a hypertonic solution.

Q.25 Name the type of simple permanent tissue, most likely to be present in: (Justify your answer with a reason)

a) Veins of leaf

b) Leaf cells responsible for photosynthesis

Q.26 Why are Xylem and Phloem considered as complex plant tissues and not simple tissues? What are Xylem and Phloem together called as?

SECTION C

Question No. 27 to 33 are short answer questions

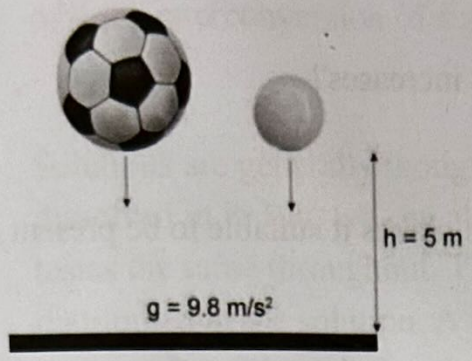
Q.27 Using the following data, **draw displacement-time graph** for a moving object:

Time(s)	0	2	4	6	8	10	12	14	16
Displacement(m)	0	2	4	4	4	6	4	2	0

Use this graph to find the average velocity for the first 4 s, for the next 4 s and for the last 6 s.

Q.28 A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of 10 ms^{-2}, with what velocity will it strike the ground? After what time will it strike the ground?

Q.29 A football and a tennis ball fall freely on a marble floor from a height of 5 m.



a) Will the football and the tennis ball hit the floor with the same momentum? Explain your answer.

b) Both balls bounced back after hitting the floor. What caused the balls to bounce back?

c) Will the balls reach a height of 5 m or less than 5 m after bouncing back? Explain your answer.

Q.30 Show that the weight of an object on the moon is 1/6th of its weight on the earth.

Q.31 During an experiment the students were asked to prepare a solution of sugar in water. Ramesh dissolved 20g of sugar in 100g of water while Sarika prepared it by dissolving 15g of sugar in water to make 150g of the solution.

(a) Are the two solutions of the same concentration

(b) Calculate the mass percentage of the solution prepared by Ramesh.

OR

Q31. Answer the following questions

(a) Calculate the mass of sodium sulphate required to prepare its 40% (mass percent) solution in 200g of water?

(b) Sea water can be classified as homogeneous as well as heterogeneous mixture. Comment.

Q.32 Answer the following questions

(a) Why do the doctors advise to put strips of wet cloth on the forehead of a person having high fever?

(b) What happens when the temperature of the solids increases?

Q.33 Give one feature or adaptation of epidermis, which makes it suitable to be present in the following parts. Also give their functions.

a) Leaf

b) Root

c) Desert plants

SECTION D

Question No. 34 to 36 are long answer questions

Q.34 a) State Newton's First Law of Motion. Deduce Newton's First Law of Motion from Newton's Second Law of Motion

b) When a hanging carpet is beaten with a stick, dust particles start coming out of it. Why?

OR

a) State Newton's Second Law of Motion. Derive its expression.

b) Calculate the change in momentum of a body weighing 5 kg when its velocity decreases from 20 m/s to 0.20 m/s.

Q.35. The scientist now say that there are actually five states of matter A, B, C, D and E. The state A has a fixed volume but no fixed shape. The state B can be compressed very easily by applying pressure and state C has a fixed shape as well as a fixed volume. The state D is a mixture of free electrons and ions whereas state E is named after an Indian scientist. (1.5+0.5+0.5+2.5=5)

a) Name the physical state of (i) A (ii) B (iii) C

b) Name one substance belongs to state C, which can be easily compressed

c) Name one substance which normally belongs to state B, whose solid form

changes directly into gaseous state.

d)Show interconversion of states A, B and C with proper labelling.

OR

Solutions are generally thought as a liquid that contains either a solid, liquid or a gas dissolved in it. But, we can also have solid solutions and gaseous solutions. A lemonade tastes the same throughout. This shows that particles of sugar or salt are evenly distributed in the solution. A solution has a solvent and a solute as its components. The component of the solution that dissolves the other component in it (usually the component present in larger amount) is called the solvent. The component of the solution that is dissolved in the solvent (usually present in lesser quantity) is called the solute. In a solution the relative amount of solute and solvent can be varied. Depending upon the amount of solute present in a solution, it can be called a dilute, concentrated or a saturated solution (1+1+2+1=5)

(a) Name the solute and solvent in tincture of iodine.

(b) What kind of solution is a lemonade-homogeneous /heterogeneous?

(c) How will you differentiate between saturated and unsaturated solution.

(d) Can alloys be considered as homogeneous mixtures? Justify your answer.

Q.36 (a) If there are 8 pairs of chromosomes in a parent cell, how many chromosomes will be there in the daughter cells after mitosis and meiosis?

(b) Why does meiosis not occur for development of a zygote to an embryo?

(c) What will happen if a cell lacks Golgi apparatus? Do such cells exist? If yes, give an example.

(2+1+2)

OR

a) The inner membrane of the mitochondria is folded into many finger-like projections. Explain what would happen if the inner membrane was not folded?

b) Why is cell division important?

c) Name any two organelles of a plant cell which have its own DNA and ribosomes.

d) If the organization of a cell is destroyed due to some physical or chemical influence, what will happen?

(1+2+1+1)

SECTION E

Question No. 37 to 39 are case-based/data -based questions with 3 short sub-parts

Q.37 We know that the earth attracts every object with a certain force and this force depends on the mass (m) of the object and the acceleration due to the gravity (g). The weight of an object is the force with which it is attracted towards the earth.

Mathematically

$W = m \times g$

Where, W= weight of object

m= mass of object

g= acceleration due to the gravitational force

As the weight of an object is the force with which it is attracted towards the earth, the SI unit of weight is the same as that of force, that is, Newton (N). The weight is a force acting vertically downwards; it has both magnitude and direction. We have learnt that the value of g is constant at a given place. Therefore at a given place, the weight of an object is directly proportional to the mass, say m, of the object, that is, W $\propto$m. It is due to this reason that at a given place, we can use the weight of an object as a measure of its mass.

Answer the following questions.

(i) Direction of weight of any object is (1)

(a) Always towards centre of earth

(b) Always away from centre of earth

(c) Weight don't have direction

(d) None of these

(ii) Which of the following has same unit (1)

(a) Mass and weight

(b) Weight and force

(c) Velocity and acceleration

(d) None of these

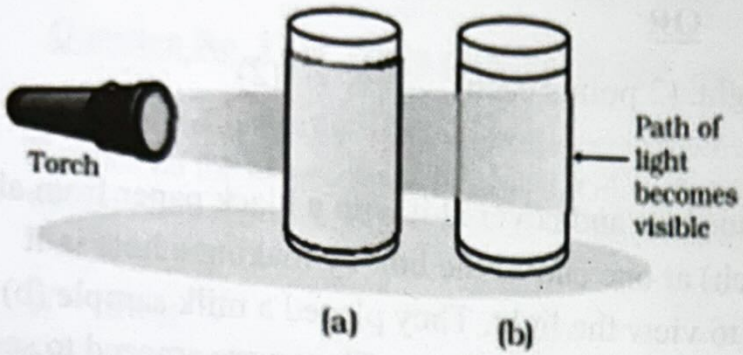
(iii) Whether weight is scalar quantity or vector quantity? Justify your answer.

OR

(iii) Differentiate between mass and weight. (2 points each) (2)

Q.38. 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 (b) 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 (a) but found that light simply passed through it.

P.T.O



Answer the following questions -

(i) Which of the following will behave like 'b'? (1)

(a) Sand in water.

(b) Salt solution.

(c) Chalk powder in water.

(d) Blood.

(ii) What kind of Colloidal solution is face cream? (1)

(a) Solid Dispersed in solid.

(b) Liquid dispersed in liquid.

(c) Gas dispersed in gas.

(d) Liquid dispersed in Gas.

(iii) Explain why the milk sample (b) was illuminated but salt solution (a) not. Name the phenomenon involved. (2)

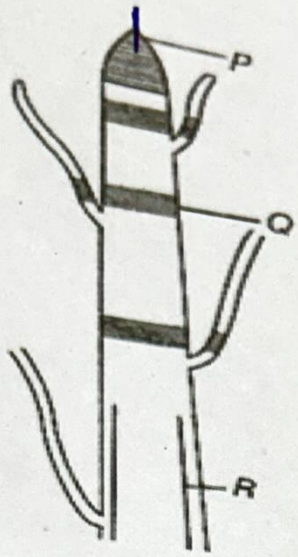
OR

Convert the following temperatures into Kelvin scale-

1. 283^0C
556.15

2. 537^0C
810.15

Q.39. Meristematic tissue contains undifferentiated cells which are the building blocks of specialised plant structures. Cells forming this tissue are very active, have dense cytoplasm, thin cellulosic walls and a prominent nuclei. The new cells produced by meristems are initially those of meristems.



(i)Which of the following is not a defining property of meristem? (1)

A) Contains undifferentiated cells

B) They exhibit the property of food storage

C) The meristem has a quality of self-renewal

D) They have a single, large and prominent nucleus

(ii) In the above figure, this represents the meristem which helps in internode length:

a) P

b) Q

c) R

d) Both P and Q

(1)

(iii) a) Root tip of a plant was cut and the plant was then replanted. What will happen to the plant now?

b)What do you mean by differentiation?

OR

(iii) a) How is the outer layer of a branch or tree different from the outer layer of a green young stem?

b) What happens to cells formed by the meristematic tissue? (1+1)