SET - B

Eng. Medium 9th GSEB Batch :	**MAHESH TUTORIALS** **SUBJECT : Science & Technology** **Group # 1** **Matter in our Surroundings** **Model Answer Paper**	**Test -** Date: Time: 1 Hr Marks : 30

SECTION - A
OBJECTIVE [10 MARKS]

1. Starch/oils/protein granules.
2. The SI unit of force is **newton (N).**
3. Stronger
4. The motion is accelerated.
5. Xylem and phloem.
6. CO_2
7. (a) smaller than 10^{-7}cm
8. (c) ms^{-2}
9. Mitochondria and Plastids.
10. True

SECTION - B

Answer the following questions : [2 Marks Each] **16**

11. Velocity of an object is the distance travelled by it per unit time in a given direction.

Velocity of an object is the displacement produced per unit time. If an object ½

has a displacement 's' in time 't' then its velocity 'v' is given by $v = \frac{s}{t}$ ½

The SI unit of velocity is same as that of speed viz meter per second (m/s or ms^{-1}). The other units are km/h or km h^{-1} and cm/s or cm s^{-1}. ½

½

12. **Give reasons**

(a) The force of attraction between particles of gas is negligible. Because of this, particles of gas can move in all directions. Thus, a gas fills the vessel completely in which it is kept. 1

(b) A wooden table has fixed shape and fixed volume, which are the main characteristics of solid. Thus, a wooden table should be called a solid. 1

OR

12. **Give reasons**

(a) Because of negligible force of attraction between particles of gas, the particles of gas have the highest kinetic energy. These properties enable the particles of gas to move in all directions and hit the walls of container from all sides. Because of this a gas exerts pressure on the walls of the container in which it is kept. 1

(b) Since, air is gas, so its particles are loosely packed and there is negligible force of attraction between its particles. Because of that we can easily move our hand in air. ½

But wood is a solid, so the force of attraction between its particles is greatest.

The particles of wooden block are closely packed. That's why we cannot move our hand through a solid block of wood. However a karate expert can exert required pressure to break the great force of attraction of the particles of a solid wooden block. ½

13. When a tree is shaken vigorously, its leaves fall down. This is due to the fact that when the tree is shaken, it moves to and fro slightly but its leaves tend to remain at rest due to their inertia and hence detach from the tree and fall down. 2

14. When acetone or alcohol or perfume is poured over palm, it evaporates quickly as these are volatile liquids. The evaporation lowers the temperature of palm and our palm feels cold. **2**

15. These are small spherical vesicles covered by a single membrane which contains digestive enzymes. They are called 'suicide bags'. Plant cell generally lack lysosomes. ½

Functions of lysosomes:

- It help in the destruction of foreign particles. ½
- They help in intracellular digestion of food particles. ½
- They help in removing dead and worn out cellular organelles by digesting them. ½

OR

15. The functions of vacuoles are :

- In plant cells it provides turgidity and rigidity to the cell. ½
- Vacuoles stores amino acids, sugar, various organic acids and some proteins. ½
- In unicellular organism (amoeba), the food vacuole contains the food items. ½
- In some unicellular organisms, specialised vacuoles plays important roles in expelling excess water and some wastes from the cell. ½

16.

Distance	**Displacement**
1. Distance is the length of the actual path traversed by a body, irrespective of its direction of motion. ½	1. Displacement is the shortest distance between the initial and final positions of a body in a given direction.
2. Distance between two given points may be same or different for different paths chosen. ½	2. Displacement between two given points is always same.
3. It is a scalar quantity. ½	3. It is a vector quantity
4. Distance covered is always positive or zero. ½	4. Displacement covered may be positive, negative or zero.

OR

16. (a) Motion has a uniform acceleration. ½

(b) Motion has a uniform acceleration and its initial velocity is not zero ($u \neq 0$).

(c) Motion has zero acceleration. ½

(d) Motion has a uniform retardation. ½

(e) Motion has a non - uniform retardation. ½

(f) Motion has a non - uniform acceleration.

17. **Non metals are usually poor conductors of heat and electricity. They are non-lustrous, non-sonorous, non-malleable and are coloured.**

(a) Iodine ½

(b) Bromine ½

(c) Graphite. Graphite is a good conductor of electricity. It is an allotropic form of carbon. ½

(d) Oxygen ½

18.

- They are plant tissues where the cells have lost the ability to divide and have assumed a permanent shape. ½
- They are derived from meristematic cells. ½
- The process of taking up a definite shape, size, structure and function are called differentiation. ½
- Permanent tissues may be simple or complex. ½

SECTION - C

Answer the following questions : [3 Marks Each] **12**

19. Here m = 100 kg, u = 5 ms^{-1}, v = 8 ms^{-1}, t = 6s

Initial momentum $p_1 = mu = 100 \times 5 = 500$ kg ms^{-1} ½

Final momentum $p_2 = mu = 100 \times 8 = 800$ kg ms^{-1}

The magnitude of the force exerted on the object, ½

$$F = ma = \frac{p_2 - p_1}{t}$$

$$= \frac{800 - 500}{6} \quad 1$$

$$= \frac{300}{6} = 50 \text{ N} \quad 1$$

OR

19. Here, $m_1 = m_2 = 1.5$ kg, $u_1 = 2.5$ ms^{-1}, $u_2 = -2.5$ ms^{-1}

Let v be the velocity of the combined object after the collision. By conservation of momentum, 1

Total momentum after collision = Total momentum before collision ½

$(m_1 + m_2)v = m_1u_1 + m_2u_2$ ½

$(1.5 + 1.5)v = 1.5 \times 2.5 + 1.5 \times (-2.5)$ ½

$3.0 = 0$

or $v = 0$ ms^{-1} ½

20.

	Straiated Muscle Fibres	Smooth Muscle Fibres	Cardiac Muscle Fibres	
a.	**Cells :** They are long cylindrical cells.	The fibres are elongated and spindle - shaped.	The cells are small and cylindrical.	½
b.	**Striation :** They possess striations or alternate light and dark bands.	Striations or light and dark bands are absent.	Striations are present but they are fainter than those of striated muscle fibres.	
c.	**Nucleus :** The muscle fibre is multinucleate. Nuclei are oval. They occur peripherally below the sarcolemma.	Smooth muscle fibre is uninucleate. Nucleus is centrally placed, oval or elongated.	The cells are uninucelate. Nucleus is oval - rounded. It is centrally placed.	½
d.	**Occurrence :** Striated muscle fibres occur in limbs, hands, feet, body wall, tongue, pharynx and upper part of oesophagus.	The fibres occur in dermis, urinogenital tracts, digestive tract, lungs, iris, blood vessels, etc.	The muscle fibres occur only in the walls of heart.	½
e.	**Nature :** They are voluntary.	They are involuntary.	They are involuntary.	
f.	**Activity :** They are able to perform fast and powerful contractions but soon get fatigued.	They perform slow but prolonged contractions without getting fatigued.	Cardiac muscle fibres perform powerful, rhythmic contractions without ever getting fatigued.	½

21. (i) Take the solvent, water in a kettle.Heat it when the solvent boils, add the solute, milk. Milk and water forms a solution. Then pour some tea leaves over a sieve. Pour slowly hot solution of milk solution over tea leaves. Colour of tea leaves goes into solution as filtrate. The remaining tea leaves being ½

insoluble remains as residue. Add requisite ammonium of sugar a solute to the tea solution which dissolves and the tea is ready. ½

(ii) I completely agree with Seema's behaviour. I would help my mother with whatever work that was possible on my behalf. 1

22.

Solids	Liquids	Gases	
Definite Shape	Indefinite shape	Indefinite shape.	½
Definite volume	Definite volume.	Indefinite volume.	
Maximum force of attraction between particles.	Less force of attraction between particles compared to solid.	Negligible force of attraction between particles.	½
Particles are closely packed.	Particles are loosely packed compared to solid.	Particles are loosely packed.	
Cannot be compressed	Can be compressed to some extent	Can be compressed	½
Kinetic energy of particles is minimum	Kinetic energy of particles is more than solid.	Kinetic energy of particles is maximum	
Particles cannot move rather they vibrate only at their fixed position.	Particles can slide over one another.	Particles can move freely	
Highest density	Density is lower than solid	Lowest density	
Cannot flow	Can Flow	Can Flow	½

SECTION - D

Answer the following questions : [4 Marks Each] **12**

23. Newton's second law of motion states that, "That rate of change of momentum of an object is proportional to the applied unbalanced force in the direction of force". ½

Consider an object of mass 'm' is moving along a straight line with an initial velocity 'u'. It is uniformly accelerated to the velocity 'v' in time 't' by applying a constant force 'F'. The uniform acceleration is 'a'. Thus, the initial and final momentum of the object will be $p_1 = mu$ and $p_2 = mv$, respectively. ½

So, according to the Newton's second law of motion,

Force α Rate of change of momentum

$\therefore$ Force α $\dfrac{\text{Change of momentum}}{\text{time}}$ ½

$\therefore$ Force α $\dfrac{\text{Final momentum} - \text{Initial momentum}}{\text{time}}$

$\therefore$ $F \alpha \dfrac{p_2 - p_1}{t}$ ½

$\therefore$ $F \alpha \dfrac{mv - mu}{t}$

$\therefore$ $F \alpha m\left(\dfrac{v - u}{t}\right)$ ½

$\therefore \quad F \quad \alpha \quad ma \qquad \left[\text{since } a = \frac{v-u}{t}\right]$

$\therefore \quad F = kma \ldots (1) \qquad$ [Where k is a constant]

The SI units of mass and acceleration are kg and m/s^2, respectively. ½

The unit of force is so chosen that the value of the constant, k becomes 1.

Substituting k = 1 in equation (1), we get

$F = ma$

OR

23. Here $m = 1{,}200$ kg

Initial velocity, $u = 90$ km/h $= 90 \times \frac{5}{18}$ ms^{-1} $= 25$ ms^{-1} ½

Final velocity, $u = 18$ km/h $= 18 \times \frac{5}{18}$ ms^{-1} $= 5$ ms^{-1} ½

Time, t = 4s

Acceleration, $a = \frac{v-u}{t}$

$= \frac{5-25}{4}$ ½

$= -5$ ms^{-1}

Magnitude of acceleration $= -5$ ms^{-2}

Change in momentum $= m(v-u)$

$= 1{,}200\,(5-25)$ ½

$= -24{,}000$ kg ms^{-1}

Magnitude of change in momentum $= 24{,}000$ kg ms^{-1}

Magnitude of force $= \frac{\text{Change in Momentum}}{\text{Time taken}}$ ½

$= \frac{24000}{4}$

$= 6000$ N ½

24. Mass of solute (sodium chloride) = 36 g (Given)

Mass of solvent (water) = 100 g (Given) ½

Then, mass of solution = Mass of solute + Mass of solvent

= (36 + 100) g ½

= 136 g ½

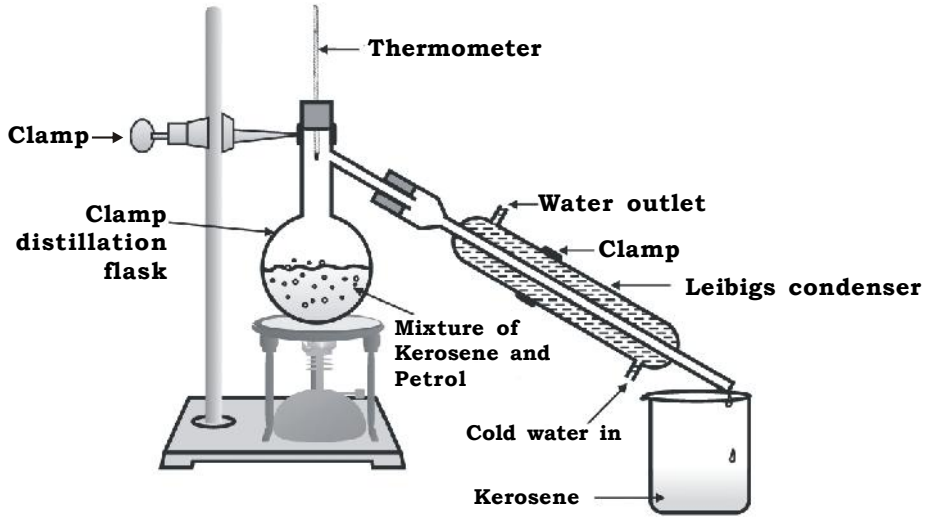
$= \frac{\text{Mass of solute}}{\text{Mass of solution}} \times 100\%$ ½

$= \frac{36}{136} \times 100\%$ ½

= 26.47% ½

25. Kerosene and petrol are miscible liquids also the difference between their boiling point is more than 25 °C so they can be separated by the method of distillation. ½

In this method, the mixture of kerosene and petrol is taken in a distillation flask with a thermometer fitted in it. We also need a beaker, a water condenser, and a Bunsen burner. The apparatus is arranged as shown in the given figure. Then, the mixture is heated slowly. The thermometer should be watched simultaneously. Kerosene will vaporize and condense in the water condenser. The condensed kerosene is collected from the condenser outlet, whereas petrol is left behind in the distillation flask. 1 ½



Separation of two miscible liquids by distillation

★★★★ *Best of Luck* ★★★★