

Motion and Time (7th)

Module Booklet Solutions

Objective Questions

LEVEL 1

1. (a)

2. (d)

Distance travelled by a body is always more than or equal to the displacement.

3. (c)

4. (b)

Scalar quantities do not have special laws for addition i.e. they are added arithmetically.

5. (b)

6. (b)

7. (c)

Displacement in opposite direction is negative. So displacement can be either positive or negative.

8. (d)

Length, mass, speed and time are scalar quantities.

9. (a)

Displacement in opposite direction is negative.

10. (a)

$$1\text{km} = 1000\text{m}$$

$$1\text{hr} = 3600\text{s}$$

$$1\text{ km/hr} = 1000/3600\text{ m/s} = 5/18\text{ m/s}$$

11. (b)

12. (d)

13. (a)

SI unit of length: m

SI unit of time: s

SI unit of speed and velocity: m/s

LEVEL 2

1. (d)

Non-uniform motion is also called variable motion.

2. (b)

Weight of a body is same as gravitational force on the body due to Earth. We know that force is a vector quantity.

3. (b)

Here, $a = -6 \text{ m/s}^2$, $t = 2 \text{ s}$, $v = 0$ (because car finally stops)

We use the equation, $v = u + at$

$$0 = u + (-6)2$$

$$\Rightarrow 0 = u - 12$$

$$\Rightarrow u = 12 \text{ m/s}$$

4. (d)

Here, $a = 4 \text{ m/s}^2$, $t = 2 \text{ s}$, $u = 20 \text{ m/s}$

We use the equation, $v = u + at$

$$v = 20 + 4 \cdot 2$$

$$\Rightarrow v = 20 + 8 = 28 \text{ m/s}$$

5. (b)

Speed = Distance/time

If distance is directly proportional to time \Rightarrow Distance/time is constant

\Rightarrow Speed is constant

6. (b)

7. (a)

Here, $a = 8 \text{ m/s}^2$, $u = 2 \text{ m/s}$, $v = 10 \text{ m/s}$

We use the equation, $v = u + at$

$$10 = 2 + 8t$$

$$\Rightarrow 8t = 8$$

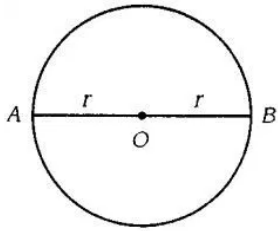
$$\Rightarrow t = 1 \text{ s}$$

Subjective Questions

- Distance is the length of total path covered by an object. It's a scalar quantity. Displacement is the shortest path covered by an object from initial point to final point. It's a vector quantity. Distance is always greater than or equal to the magnitude of displacement.
- Translatory motion: It's a motion in which all the points of a moving body move along a straight line. Eg: Motion of car on a straight road.
 - Oscillatory motion: To and from motion of an object along the same path about its mean position. Eg: Motion of a pendulum
 - Circular motion: Motion of a body along a circular path. Eg: Whirling of a stone tied to a string.
- Scalar Quantity: A quantity which has only magnitude but no specific direction. Eg: Mass and time
- Vector Quantity: A quantity which has both magnitude and direction. Eg: Velocity and force
- A person inside a moving train is at rest with respect to the train but he is in motion with respect to an observer on the ground.

- b) Two buses are moving along a straight line with the same speed. A person inside first bus is at rest with respect to the person inside the second bus. But the person in the first bus is in motion with respect to an observer on the ground.

6.



Here radius of circle, $r = 1 \text{ m}$

Distance covered = $\frac{1}{2}$ of circumference of circle = $\pi r = \pi \text{ m}$

Magnitude of displacement = Diameter of circle = $2r = 2 \text{ m}$

7. Speed is equal to distance travelled per unit time. It's a scalar quantity.
Velocity is defined as displacement per unit time. It's a vector quantity.

8. Here, $u = 50 \text{ m/s}$, $v = 60 \text{ m/s}$, $t = 2 \text{ s}$

We use the equation, $v = u + at$

$$60 = 50 + 2a$$

$$\Rightarrow 2a = 10$$

$$\Rightarrow a = 5 \text{ m/s}^2$$

9. Here, $a = 0.5 \text{ m/s}^2$, $t = 20 \text{ s}$, $u = 0$ (runner starts from rest)

We use the equation, $v = u + at$

$$v = 0 + 0.5 \cdot 20$$

$$\Rightarrow v = 10 \text{ m/s}$$

10. Translatory motion: It's a motion in which all the points of a moving body move along a straight line. Types of translatory motion: a) Linear motion b) Curvilinear motion