Chapter-8

MOTION

Sub-Topic Name:

- Motion
- Distance and Displacement
- Speed and Velocity
- Acceleration
- Graphical Representation of Motion
- Three Equations of Motion
- Derivation of Three Equations of Motion

VERY VERY SHORT ANSWER TYPE

1. What is meant by a body at rest?

2. What do you mean by a negative displacement?

3. Define the term velocity?

4. Define the term negative acceleration?

5. Why is the motion of satellites around the earth is considered an accelerated motion?

6. What is reference point?

7. Define average speed?

8. Define acceleration of a body?

9. Define circular motion?

10. Which speed is greater: 30 m/s or 30 km/h.

11. What is the speed of light in vacuum?

12. What is the S. I. unit of speed?

13. Give an example of uniformly accelerated motion.

14. Give an example of non – uniform acceleration.

15. What is the equation for velocity – time relation?

VERY SHORT ANSWER TYPE

1. Justify the statement "Displacement of a particle is independent of the path taken"?

2. What is the difference between uniform motion in a straight line and uniform circularmotion?

3. Distinguish between distance and displacement?

4. A body can have zero average velocity but not zero average speed. Explain.

5. Draw a distance-time graph for an object at rest.

6. Draw velocity-time graph for an object moving with uniform velocity.

7. A bus decreases its speed from 80 km/hr to 50 km/hr in 4sec. find the acceleration of thebus.

8. A train starting from a railway station and moving with a uniform acceleration attains a speed of 40 km/hr in 10 min. Find its acceleration.

9. A motor boat starting from rest on a lake accelerates in a straight line at a constant rate of 3.0 m/s for 8.0 s. How far does the boat travel during this time?

10. Distinguish between scalar and vector quantity?

11. Express average velocity when the velocity of a body changes at a non-uniform rate anda uniform rate.

12. Distinguish between speed and velocity.

13. A bus decreases its speed from 80 km/h to 60 km/h in 5s. Find acceleration of the bus?

14. What is uniform motion? Give an example.

15. What is acceleration? How will you express it mathematically?

SHORT ANSWER TYPE

1. (a) Define average speed.

    (b) A bus travels a distance of 120 km with a speed of 40 km/h and returns with a speed of 30 km/h. Calculate the average speed for the entire journey.

2. Define uniform and non-uniform motion. Write one example for each.

3. What does the odometer of an automobile measure? Which of the following is moving faster? Justify your answer.

    (i) A scooter moving with a speed of 300 m per I minute.

    (ii) A car moving with a speed of 36 km per hour.

4. A car travels from stop A to stop B with a speed of 30 km/h and then returns back to A with a speed of 50 km/h. Find

    (i) displacement of the car.

    (ii) distance travelled by the car.

    (iii) average speed of the car.

5. Distinguish between speed and velocity.

6. A circular cycle track has a circumference of 314 m with AB as the diameter. A cyclist travels from A to B along the circular path with a constant velocity of magnitude 15. 7 m/s. Find:

(i) the distance moved

(ii) the displacement of the cyclist if AB represents North-South direction

(iii) the average velocity

7. A scooter travels at a speed of 5m/s for 2 minutes, at 12.5 m/s for 10 minutes and then with 10m/s for 5 minutes. What is the average velocity and distance covered in this time?

8. A ship is moving at a speed of 56 km/hr. One second later, it is moving at a speed of 58km/hr. What is (i) its acceleration, and (ii) the distance covered?

9. A train travels at a speed of 60 km/h for 0.52 h, at 30km/h for the next 0.24 h and then at 70 km/h for the next 0.71 h. What is the average speed of the train?

10. A ball is gently dropped from a height of 20 m. If its velocity increases uniformly at the rate of 10 m/s², with what velocity will it strike the ground? After what time will it strike the ground?

11. The brakes applied to a car produce a negative acceleration of 6m/s². If the car takes 2 seconds to stop after applying the brakes, calculate the

12. What do you understand by the term acceleration? When is acceleration positive andwhen is it negative? State the units of acceleration in SI system.

13. On a 120 km track, a train travels the first 30 km at a uniform speed of 30 km/h. Howfast must the train travel the next 90 km so as to average 60 km/l for the entire trip?

LONG ANSWER TYPE

1. Draw velocity-time graph for a uniformly accelerated object. Using velocity-time graph, Derive v = u + at.

2. Draw velocity-time graph for a uniformly accelerated object. Using velocity-time graph, Derive S = ut +1/2 at^2.

3. Draw velocity-time graph for a uniformly accelerated object. Using velocity-time graph, Derive v^2-u^2 = 2as.

4. A driver of a car travelling at 52 km/h applies the brakes and accelerates uniformly in the opposite direction. The car stops in 5 sec. Another driver going at 3 km/h in another car applies his breaks slowly and stops in 10sec. On the same graph paper plot the speed versustime graphs for the two cars. Which of the two cars travelled farther after the brakes were applied?

5. Joseph jogs from one end A to the other end B of a straight 300 m road in 2 minutes 50 seconds and then turns around and jogs 100 m back to point C in another 1 minute. What are Joseph's average speeds and velocities in jogging?
(a). From point A to point B.
(b). From point A to point C.

6.A circular track has a circumference of 3140 m with AB as one of its diameter. A scooterist moves from A to B alone the circular path with a uniform speed of 10 m/s. Find
(a) distance covered by the scooterist,
(b) displacement of the scooterist, and
(c) time taken by the scooterist in reaching from A to B.

7. (a) Differentiate between uniform linear and uniform circular motion.
(b) Write any four examples of uniform circular motion.
(c) Is uniform circular motion accelerated motion?

8. (a) Differentiate between speed and velocity.

(b) When is a body said to have uniform velocity?

(c) How can we describe the position of an object?
Illustrate with suitable example.