

Class – XI

Physics

CHAPTER 3: MOTION IN A STRAIGHT LINE

1. What is kinematics?

Ans: It is a branch of mechanics concerned with the motion without the reference of the force.

2. What is mechanics?

Ans: It is the branch of physics in which we study the motion of object.

3. Define rest and motion?

Ans: If the position of the object does not change w.r.t its surroundings with the passage of time, then the object is said to be in rest.

If the position of the object changes w.r.t its surroundings with the passage of time, then the object is said to be in motion.

4. Define different types of motion?

Ans: On the basis of path followed different types of motion are –

- I. **Rectilinear motion**: It is the type of motion in which particles moves along a straight line.
- II. **Circular motion** : It is the type of motion in which particles moves along a circular path.
- III. **Oscillatory motion** : The motion in which a particle moves to and fro about a given point.

5. How many coordinate required to define the position of the object?

Ans: Position is a point where an object is situated. On the basis of coordinate, three types coordinate required to define the position of the object. Example- 1D, 2D and 3D.

6. What is frame of reference?

Ans: It is a coordinate system with a clock w.r.t which an observer can describe the position, displacement and acceleration of the object.

7. What is point object?

Ans: If the size of the object is much smaller than the distance it travels in a reasonable duration of time is called point object.

(i) A car covering a distance of 10 km can be treated as a **point object**.

(ii) Earth can be regarded as a **point object** for studying its motion around the Sun.

8. What is distance or path length?

Ans: It is the actual path followed by the body. It is always positive and a scalar quantity.

9. What is displacement?

Ans: The shortest distance between the initial and final position of the object is called displacement. It may be positive, negative or zero. It is a vector quantity.

10. What is uniform and non uniform motion?

Ans: When a body travels equal distance in equal interval of time is called uniform motion.

When a body travels unequal distance in equal interval of time is called non uniform motion.

11. What is velocity?

Ans: The rate of change in position or displacement of the object w.r.t time is called its velocity.

Velocity = Displacement / Time taken.

It is a vector quantity. It may be positive, negative or zero.

Its unit is metre/sec. Dimension is LT^{-1} .

12. What is Relative Velocity?

Ans: Relative velocity of one object with respect to another object is the time rate of change of relative position of one object with respect to another object. Relative velocity of object A with respect to object B,

$$V_{AB} = V_A - V_B$$

13. What is Average Velocity?

Ans: The ratio of the total displacement to the total time taken is called average velocity.

Average velocity = Total displacement / Total time taken

14. What is speed?

Ans: The distance cover by the object per unit time is called its speed.

It is a scalar quantity. Its unit is metre/sec. Dimension is LT^{-1} .

15. What is Average Speed?

Ans: The ratio of the total distance travelled by the object to the total time taken is called average speed of the object.

Average speed = Total distanced travelled / Total time taken

16. What is acceleration?

Ans: The rate of change of velocity of the object w.r.t time is called its acceleration.

It is a vector quantity. It may be positive, negative or zero. Its unit is meter/sec².

Dimension is LT⁻².

17. What is uniform and non uniform acceleration?

Ans: If the change in velocity of the object is equal in equal interval of time, then it is called uniform acceleration.

If the change in velocity of the object is unequal in equal interval of time, then it is called non uniform acceleration.

18. Write down the equations of uniformly accelerated motion?

Ans: If a body starts with velocity 'u' and after time t its velocity changes to 'v', if the uniform acceleration is 'a' and the distance travelled in time t is 's', then the following relations are obtained, which are called equations of uniformly accelerated motion.

(i) $v = u + at$

(ii) $s = ut + at^2/2$

(iii) $v^2 = u^2 + 2as$