

## CHAPTER – 10

### MOTION AND MEASUREMENT OF DISTANCES

- Different modes of transport are used to go from one place to another.
- In ancient times, people used length of a foot, the width of a finger, the distance of a step as units of measurement. This caused confusion and a need to develop a uniform system of measurement arose.
- Now, we use International System of Unit ( SI unit). This is accepted all over the world.
- Metre is the unit of length in SI unit.
- Motion in a straight line is called rectilinear motion.
- In circular motion an object moves such that its distance from a fixed point remains the same.
- Motion that repeats itself after some period of time, is called periodic motion.
- **Measurement:** The comparison of an unknown quantity with some known quantity of the same kind. Measurement of an object consists of :  
The unit of measurement.  
The number of units the object measures.
- **Conventional Methods of Measurement:** Conventional measurements have only been approximate measurement. Differ from person to person. Lack precision.
  - (i) **Handspan:** Length between the tip of thumb and little finger.
  - (ii) **Cubit:** Length between the tip of middle finger and elbow.
  - (iii) **Arm length:** Length from shoulder to the tip of middle finger.
  - (iv) **Footstep:** It is the distance covered by a step.
- **Standard units of Measurement:** It is a unit to measure any quantity completely and uniformly. Standard units for measuring, length-metre, mass-kilogram, time-second.
- **Motion:** When the position of a body does not change with the passage of time, the body is said to be at rest. When the position of a body changes with the passage of time, the body is said to be in motion.

#### **Types of motion:**

- (a) **Linear motion:** Linear motion are further classified into two:



- (i) **Rectilinear Motion:** Object moves from one position to another along a straight line. Example: group of ants moving in a line.
- (ii) **Curvilinear Motion:** Object moving along a curved line. Example: a car moving along a curved road.
- (b) **Random Motion:** When object moves from one position to another and changes direction in an irregular manner. Example: butterfly, flies randomly in garden.
- (c) **Circular Motion:** Object moves in a circular manner in relation to its own axis or around a fixed centre. Object remains at the same distance from a fixed point which is the centre of the path of the motion. Two types of circular motion:
  - (i) **Revolution:** Object moves as a whole around a fixed centre. Example: earth revolving around the sun in a definite orbit.
  - (ii) **Rotation:** Object moves in a circular path in relation to its own fixed axis. Example: blades of a moving fan, windmill, etc.
- (d) **Vibratory Motion:** Object moves to and fro very fast. Example: strings of a guitar when plucked.
- (e) **Periodic Motion:** Object oscillates to and fro along the same path again and again and with the same speed. Time taken by an object to complete one oscillation is same, no matter how many oscillations the object takes. Example: heartbeat, pendulum of a clock.
- (f) **Non-periodic Motion:** Object does not repeat motion at regular intervals of time.
- (g) **Uniform Motion:** When the body covers equal distance in equal time interval.
- (h) **Non-uniform Motion:** Motion in which the body covers unequal distance in equal interval of time.