Revision Notes

CHAPTER – 10

Motion and Measurement of Distances

- **REST :** The objects which remain stationary at a place and do not change their position are said to be at rest.
- Different modes of transport are used to go from one place to another.
- In ancient times, people used the 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.
- we use International System of Unit (SI unit). This is accepted all over the world.
- Meter is the unit of length in SI unit.
- Motion in a straight line is called rectilinear motion.
- In a 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.

1. **Hand span:** Length between the tip of the thumb and little finger.
2. **Cubit:** Length between the tip of middle finger and elbow.
3. **Arm length:** Length from shoulder to the tip of middle finger.
4. **Footstep:** It is the distance covered by a step.

Needs for standard units of measurement:-

Units such as hand span, foot, footstep, cubit, etc., vary. they depend upon the size of an individual's hand, foot,etc., hence such units cause confusion in measurements.

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.

'The system International of 'Units' or better known as 'S.I. UNITS.

RULES FOR WRITING SYMBOLS OF UNITS

1. Symbols for units are usually written in small letters.
2. Symbols is not given in plural form.
3. Symbols for a unit is not to be followed by a full stop unless it is at the end of a sentence.

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 is further classified into two:

1. **Straight line motion or Rectilinear Motion:** Object moves from one position to another along a straight line. Example: a group of ants moving in a line.
2. **Curvilinear Motion:** Object moving along curved lines. Example: a car moving along a curved road.

(b) Random Motion: When an object moves from one position to another and changes direction in an irregular manner. Example: butterfly, flies randomly in the garden.

(c) Circular Motion: Object moves in a circular manner in relation to its own axis or around a fixed centre. An 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, taking rounds around: Object moves as a whole around a fixed centre.

Example: Earth revolving around the sun in a definite orbit.

(ii) Rotation or spinning motion: Object moves in a circular path in relation to its own fixed axis. Example: blades of a moving fan, windmill, etc.

Rotation is restricted to the central axis. The extended parts attached to the rotating axis are in revolutionary motion.

(d) Vibratory Motion: Object moves to and fro very fast. Example: strings of a guitar when plucked.

(e) Oscillatory 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, a pendulum of a clock.

(f) periodic motion: - The motion which repeats at regular intervals of time is a periodic motion. Ex. heartbeat, pendulum o clock, hands of a clock.

(g) Non-periodic Motion: Object does not repeat motion at regular intervals of time.Ex. Earthquake, the eruption of a volcano, landslide, storm.

(h) Mixed motion: - more than one type of motion at the same time. Ex. A cricket ball bowled shows linear as well spin motion.

(i) Resultant motion: - one kind of motion resulting in another kind of motion is a resultant motion. Ex. wheels of a bicycle rotate about its axis resulting in the linear motion of the bicycle on the road.

(j) Random motion: - The motion without any sequence or direction is random motion. Ex. A buzzing bee, A player of a football on the field.

(k) Uniform Motion: When the body covers the equal distance in equal time interval.motion of a clock hand.

(l) Non-uniform Motion: Motion in which the body covers the unequal distance in equal inter of time, the motion of a bus.