

Ch 10 Motion & Measurement of Distance

EXERCISES

Give two examples each of modes of transport used on land, water and air.

Ans:

(i) Land—Bus, truck, train.

(ii) Water—Ship, boat.

(iii) Air—Aeroplane, Helicopter.

2. Fill in the blanks:

(i) One metre is _____

(ii) Five kilometre is _____

(iii) Motion of a child on a swing is _____ .

(iv) Motion of the needle of a sewing machine is _____ .

(v) Motion of wheel of a bicycle is _____ .

Ans:

(i) 100

(ii) 5000

(iii) periodic (oscillatory) motion

(iv) periodic oscillatory (v) circular

Why can a pace or a footstep not be used as a standard unit of length?

Ans: Because a pace or a footstep of each and every person is not equal.

4. Arrange the following lengths in their increasing magnitude :

1 metre, 1 centimetre, 1 kilometre, 1 millimetre.

Ans: Ascending order of length:

1 millimetre < 1 centimetre < 1 metre < 1 kilometre

5. The height of a person is 1.65 m. Express it in cm and mm.

Ans:

(a) 1.65 m, as one metre = 100 cm

$$= 1.65 \times 100 \text{ cm} = 165 \text{ cm}$$

(b) $1.65 \times 100 \times 10 \text{ mm} = 1650 \text{ mm}$.

6. The distance between Radha's home and her school is 3250 ,m. Express this distance in km.

Ans: school is 3250 ,m. Express this distance in km.

Ans:

As one km = 1000 m

So,

$$3250 \text{ m} = \frac{3250}{1000} \text{ km} = 3.250 \text{ km}$$

Thus, distance between Radha's home and her school is 3.250 km.

7. While measuring the length of a knitting needle, the reading of the scale at one end is 3.0 cm and at the other end is 33.1. What is the length of the needle?

Ans: Length of the needle = $33.1 \text{ cm} - 3.0 \text{ cm} = 30.1 \text{ cm}$.

8. Write the similarities and differences between the motion of a bicycle and a ceiling fan that has been switched on.

Ans:

(i) Similarity: Both the wheel of a bicycle and a ceiling fan exhibit motion on a fixed axis.

Dissimilarity: Bicycle moves forward thus executes rectilinear motion but fan does not show such motion.

9. Why could you not use an elastic measuring tape to measure distance? What would be some of the problems you would meet in telling someone about a distance you measured with an elastic tape?

Ans: An elastic measuring tape gives

incorrect length of the distance between two points.

Reasons:

(i) The length of the elastic tape varies and depends upon the force by which it is stretched.

(ii) Measurement would vary between 2 or 3 readings even when measured by the same person and by the same elastic tape.

(iii) Measurement would also vary if different persons measure the same distance.

10. Give two examples of periodic motion.

Ans:

(i) Oscillations of a pendulum.

(ii) Motion of swing/motion of earth round the sun.

Extra Questions

1. What type of motion do the following objects have?

(a) the galloping of a horse

(b) the needle of a sewing machine

(c) the movements of a mosquito

(d) the blades of an electric fan

(e) the smoke from a lighted dhoopbatti

(f) wheels of moving car.

Ans:

(a) The galloping of a horse: Linear motion.

- (b) The needle of a sewing machine: Periodic motion.
- (c) Movement of a mosquito: Random motion.
- (d) Blade of an electric fan: Circular motion.
- (e) The smoke from a lighted dhoopbatti: Random motion.
- (f) Wheels of moving car: Linear motion and Rotational motion.

2. Give two examples for each of the following motions:

(i) Linear motion

(ii) Spinning motion

(iii) Oscillatory motion

(iv) Periodic motion

(v) Vibrational motion

(vi) Circular motion

(vii) Random motion

- Ans:**
- (i) Linear motion: (a) Rolling of ball on ground, (b) Moving of bicycle on road,
 - (ii) Spinning motion: (a) Rotating fan, (b) Wheel of sewing machine.
 - (iii) Oscillatory motion: (a) Pendulum of clock, (b) Motion of a child on a swing,
 - (iv) Periodic motion: (a) Pendulum of clock, (b) Motion of a swing, heartbeat.
 - (v) Vibrational motion: (a) String of a guitar, (b) Surface of drums.
 - (vi) Circular motion: (a) Rotation of fan, (b) Bicycle wheel.
 - (vii) Random motion: (a) Motion of football players, (b) Movement

3. Why do we need standard unit for measurement?

Ans: We need standard unit for measurement to make our judgement more reliable and accurate. For proper dealing, measurement should be same for everybody. Thus there should be uniformity in measurement. For the sake of uniformity we need a common set of units of measurement, which are called standard units. Nowadays SI units are used in science and technology almost universally.

4. Describe the different types of motion with examples.

Ans:

1 Rectilinear Motion: Motion of the object in straight line is called rectilinear motion. For example : Motion of train on track, motion of ants in a straight path, motion of freely falling stone from top of the building towards the ground.

2. Circular Motion: Motion of object in a circular path is called circular motion. For example: Children playing ringa ringa roses or moving in a circle, motion of Earth around the Sun.

3. Periodic Motion : Motion of a object which repeats itself after a certain period of time is called periodic motion. For example : Motion of Earth around the sun is periodic as well as circular as it repeats its motion after time of 365 days. Motion of simple pendulum is periodic. Motion of minute and second hand in a watch is periodic.

4. Non-periodic Motion : A motion that does not repeat itself at regular intervals or a motion that does not repeat itself at all is called non-periodic motion. Examples of non-periodic motion are a car moving on a road, a bird gliding across the

