Chapter 13: Time and Motion

Multiple Choice Questions **Page-133**

1. (b) 2. (b)

Multiple Choice Questions **Page-135**

1. (a) 2. (a)

EXERCISE

A. Tick (✓) the correct options.

1. (a) 2. (b) 3. (c) 4. (d) 5. (c) 6. (b)

B. Fill in the blanks.

1. time period 2. Speed 3. distance
4. non-uniform 5. frequency 6. atomic clocks

C. Very Short Answer Questions.

1. Second (s) 2. Metre per second (m/s) 3. Distance-time graph
4. Stopwatch 5. Distance and time

D. Short Answer Type-I Questions.

1. A simple pendulum consists of a small metal ball (bob) suspended by a long thread from a rigid support, such that the bob is free to swing back and forth.
2. Time period (T) = 0.25 s

   We know,

$$\text{Frequency (f)} = \frac{1}{\text{Time period (T)}}$$

$$f = \frac{1}{0.25} = 4 \text{ Hz}$$

   $\therefore$ Frequency of the pendulum is 4 Hz.
3. Straight line represents uniform motion and curved line represents non-uniform motion in a distance-time graph.
4. A motion which repeats itself at regular intervals of time is called periodic motion.
5. Odometer is an instrument which shows the distance travelled by the vehicle in kilometres.

E. Short Answer Type-II Questions.

1. (a) An object is said to be in motion when its position changes with time or with respect to its surroundings.

   (b) An object which takes longer time to cover a certain distance is said to be in slow motion.

   An object which takes shorter time to cover the same distance is said to be in fast motion.
2. (a) An object moving along a straight-line path is said to have uniform motion if its speed remains constant, but an object moving along a straight-line path is said to have non-uniform motion when its speed keeps on changing.

   (b) Speedometer indicates the speed of the vehicle in kilometres per hour (km/h).
3. (a) Principle of periodic motion

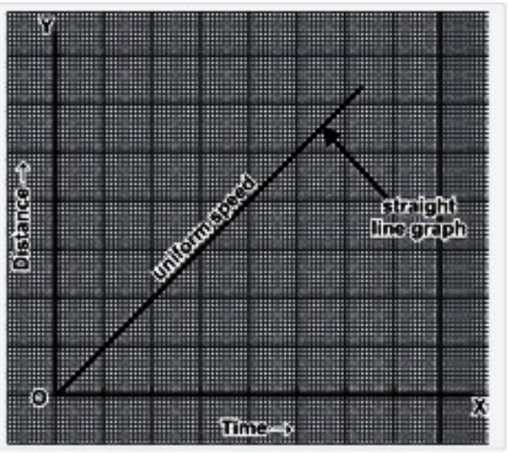
(b) We should be punctual in our life because it makes our life more systematic and comfortable. Punctuality brings discipline in our life.

4. (a) Uniform motion
   (b) Non-uniform motion
   (c) No motion

F. Long Answer Questions.

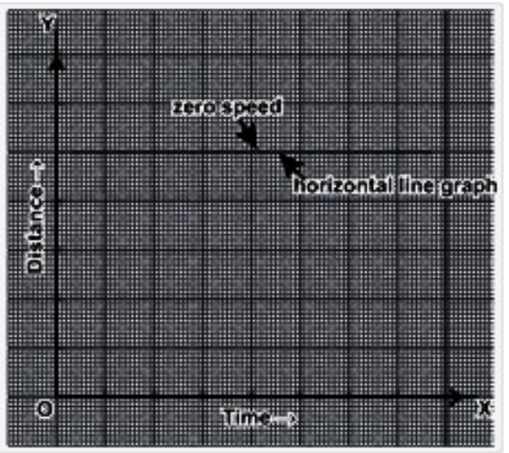
1. (a) The length of the string from the point of suspension to the centre of the bob, is called the length of the pendulum.
   (b) The one complete to-and-fro motion of the bob about its mean position is called an oscillation of the pendulum.
   (c) The maximum displacement of the bob from its mean position on either side is called the amplitude of the pendulum.
   (d) The time taken by the bob of a pendulum to complete one oscillation is called the time period of the pendulum.
   (e) The number of oscillations made by a pendulum in 1 second is called the frequency of the pendulum.

2. (a)



Distance-time graph for uniform speed

(b)



Distance-time graph when the object is at rest

G. Numericals.

1. Here, speed = 3m/s

time taken = 20 minutes

(we know, 1 minute = 60 s)

= 20 × 60 = 1200 seconds

We know, Speed = $\frac{\text{distance travelled}}{\text{time taken}}$

or distance travelled = speed × time taken

= 3 m/s × 1200 s

= 3600 m

= 3.6 km (1 km = 1000 m)

Thus, the distance between Monica's house and her school is 3.6 km.

2. Here, (i) in the first case

Speed = 20 km/h

Time taken = 15 minutes

$= \frac{15}{60} = \frac{1}{4}$h (1 hour = 60 minutes)

We know, Speed $= \frac{\text{distance travelled}}{\text{time taken}}$

or distance travelled = speed × time taken

$= 20 \text{ km/h} \times \frac{1}{4} \text{ h}$

∴ distance travelled = 5 km

(ii) In the second case

Speed = 60 km/h

Time taken = 15 minutes

$= \frac{15}{60} = \frac{1}{4}$h (1 hour = 60 minutes)

We know, Speed $= \frac{\text{distance travelled}}{\text{time taken}}$

∴ distance travelled = speed × time taken

$= 60 \text{ km/h} \times \frac{1}{4} \text{h}$

= 15 km

Total distance covered = 5 + 15 km

= 20 km

Thus, the total distance covered by car is 20 km.

3. Distance travelled = 300 km

Time taken = 5 hours

Speed $= \frac{\text{distance travelled}}{\text{time taken}}$

∴ Speed of the train $= \frac{300 \text{ km}}{5 \text{ hour}}$

= 60 km/h

Thus, the speed of the train is 60 km/h.