Motion and Time

Q.1 Classify the following as motion along a straight line, circular or oscillatory motion.

(i) Motion of your hands while running.
(ii) Motion of a horse pulling a cart on a straight road.
(iii) Motion of a child in merry-go –round.
(iv) Motion of a child on a seesaw.
(v) Motion of the hammer of an electric bell.
(vi) Motion of a train on straight bridge.

Sol:

(i) Motion of your hands while running : **Oscillatory motion**
(ii) Motion of a horse pulling a cart on a straight road : **Linear motion**
(iii) Motion of a child in merry-go –round : **Circular motion**
(iv) Motion of a child on a seesaw : **Oscillatory motion**
(v) Motion of the hammer of an electric bell : **Oscillatory motion**
(vi) Motion of a train on straight bridge : **Linear motion**

Q.2 Which of the following are not correct?

(i) The basic unit of time is second.
(ii) Every object moves with a constant speed.
(iii) Distance between two cities is measured in kilometers.
(iv) The time period of a given pendulum is not constant.
(v) The speed of a train is expressed in m/h.

Sol:

(i) The basic unit of time is second. - **Correct**
(ii) Every object moves with a constant speed. -**Not correct**
(iii) Distance between two cities is measured in kilometers. - **Correct**
(iv) The time period of a given pendulum is not constant. - **Not correct**
(v) The speed of a train is expressed in m/h. - **Not correct**

Q.3 A simple pendulum takes 32 s to complete 20 oscillations. What is the time-period of the pendulum?

Sol: Time taken by a simple pendulum for 20 oscillation = 32 s
Time taken for 1 oscillation = 32s/20.
Time period = 1.6 s

Q.4 The distance between two stations is 240 km. A train takes 4 hours to cover this distance. Calculate the speed of the train.

Sol: the distance b/w two stations = 240 km
Time taken = 4 h
Since, Speed = distance/time
Speed= 240 km/4 h
Speed = 60 km/h
So, speed of the train is 60 km/h.

Q.5 The odometer of a car reads 57,321.0 km when the clock shows the time 8.30 AM. The odometer reading was changed to 57,336.0 km. calculate the speed of the car in km/min during this time. Express the speed in km/h also.

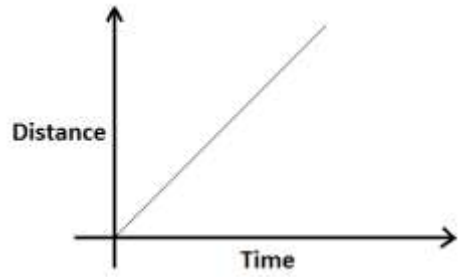
Sol: Odometer reading of the car at 8.30 AM = 57321.0 km
Odometer reading of the car at 8.50 AM = 57336.0 km
So, Distance travelled = 57321-57336 = 15 km
Time taken = 20 min.
Since, Speed = distance / time
Speed = 15 km/20 min.
Speed = 0.75 km/min
Speed = 0.75 x 60
Speed = 45 km/h.
So, speed of car is 45 km/h.

Q.6 Salma takes 15 minutes from her house to reach her school on bicycle. If the bicycle has a speed of 2 m/s, calculate the distance between her house and the school.

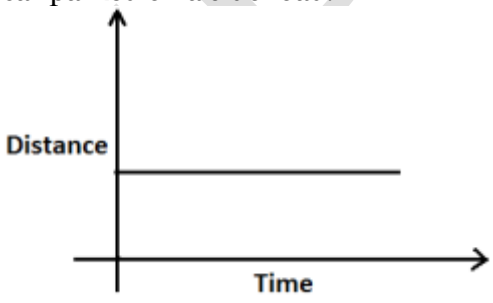
Sol: Speed of the bicycle = 2 m/s
Time taken = 15 min = 15 x 60 s = 900 s.
Since, Distance travelled = speed x time
Distance travelled = 2 x 900 s
Distance travelled = 1800 m
= 1.8 km.
So, travelled distance is 1.8 km

Q.7 Show the shape of the distance-time graph for the motion in the following cases:
(i) A car moving with a constant speed.
(ii) A car parked on a side road.

Sol: of the distance-time graph for the motion in the following cases:
(i) A car moving with a constant speed.



(ii) A car parked on a side road.



Q.8 Which of the following relations is correct?

(i) Speed= Distance x Time.
(ii) Speed = Distance / Time.
(iii) Speed = Time / Distance.
(iv) Speed = 1/ (Distance X Time)

Sol: (ii) Speed = Distance / Time.

Q.9 The basic unit of speed is:

(i) Km/min
(ii) m/min
(iii) km/h
(iv) m/s

Sol: (iv) m/s

Q.10 A car moves with a speed of 40 km/h for 15 minutes and then with a speed of 60 km/h for the next 15 minutes. The total distance covered by the car is:

(i) 100 km
(ii) 25 km
(iii) 15 km
(iv) 10 km

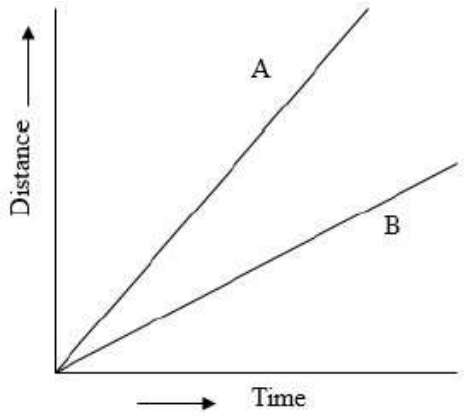
Sol: (ii) 25 km

Explanation: distance covered in first 15 min:
Distance = speed x Time
= 40 x 1/4 = 10 km
distance covered in next 15 min:
Distance = speed x Time
= 60 x 1/4 = 15 km
Total distance = 10+15 = 25 km

Q.11 Suppose the two photographs, shown in Fig. 13.1 and Fig.13.2, had been taken at an interval of 10 seconds. If a distance of 100 meters is shown by 1 cm in these photographs, calculate the speed of the blue car.

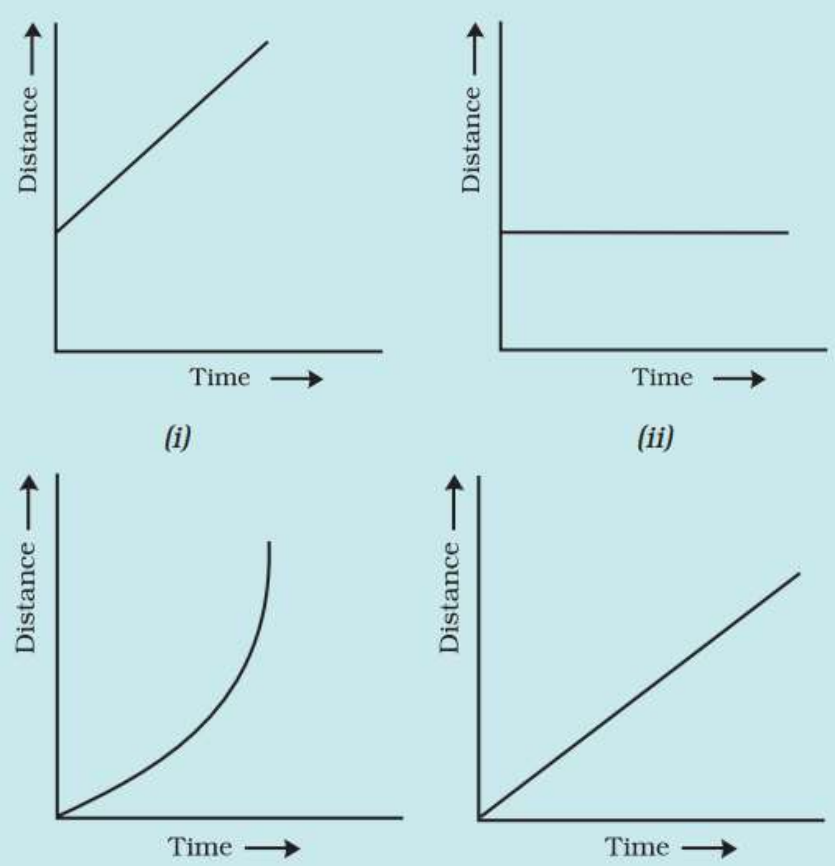
Sol: time = 10 s
distance = 100 m
since, speed = distance/time
Speed of blue car = 100 m/10s = 10 m/s

Q.12 Fig. 13.5 shows the distance-time graph for the motion of two vehicles A and B. Which is one of them moving faster?



Sol: 'A' is moving faster.

Q.13 Which of the following distance time-graph a truck moving with speed which is not constant?



Sol: (iii)