# MOTION AND TIME

EXERCISE

Question 1:
Classify the following as motion along a straight line, circular or oscillatory motion.
   (a) Motion of your hands while running.
   (b) Motion of a horse pulling a cart on a straight road.
   (c) Motion of a child in a merry-go-round.
   (d) Motion of a child on a see-saw.
   (e) Motion of the hammer of an electric bell.
   (f) Motion of a train on a straight bridge.

Answer:
(a) Oscillatory
(b) Straight line
(c) Circular
(d) Oscillatory
(e) Oscillatory
(f) Straight line
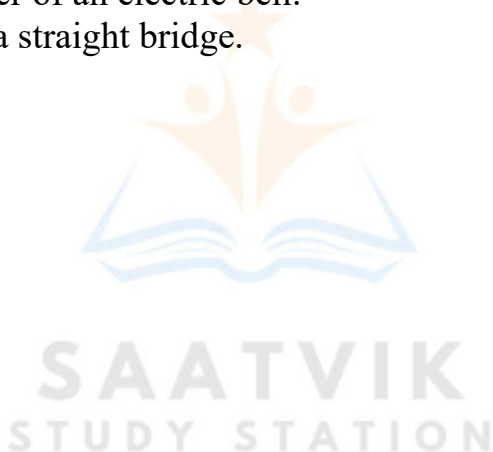
Question 2:
Which of the following are not correct?
   (a) The basic unit of time is second.
   (b) Every object moves with a constant speed.
   (c) Distances between two cities are measured in kilometres.
   (d) The time period of a given pendulum is not constant.
   (e) The speed of a train is expressed in m/h.

Answer:
(b), (d) and (e) are not correct.

Question 3:

A simple pendulum takes 32 s to complete 20 oscillations. What is the time period of the pendulum?
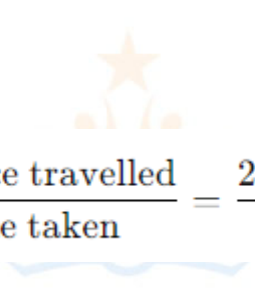
Answer:

Time period of simple pendulum is given by

$$\text{Time period} = \frac{\text{Time taken}}{\text{Number of oscillations}} = \frac{32\text{ s}}{20} = 1.6\text{ s}$$

(i.e., the time to complete one cycle)

Question 4:

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

Answer:

$$\text{Speed} = \frac{\text{Distance travelled}}{\text{Time taken}} = \frac{240\text{ km}}{4\text{ h}} = 60\text{ km/h}$$

Question 5:

The odometer of a car reads 57321 km when the clock shows the time 08:30 AM. What is the distance moved by the car, if at 08:50 AM, the odometer reading has changed to 57336 km? Calculate the speed of the car in km/min during this time. Express the speed in km/h also.

Answer:

As we know that,

$$\text{Speed} = \frac{\text{Distance covered}}{\text{Time taken}}$$

Given, distance covered = 57336 - 57321 = 15 km

Time taken = 08:50 AM - 08:30 AM = 20 min

So, speed $= \frac{15 \text{ km}}{20 \text{ min}} = \frac{3}{4}$ km/min

Now, speed in km/h is given by $\frac{3}{4} \times 60 = 45$ km/h

$$1 \text{ min} = \frac{1}{60} \text{ h}$$

Question 6:

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

Answer:

As we know that

$$\text{Distance covered by the body} = \text{Speed} \times \text{Time}$$

Given, speed = 2 m/s

Time = 15 min = 15 \times 60 = 900 s

$$\text{So, distance} = 900 \times 2 = 1800 \text{ m} = 1.8 \text{ km}$$
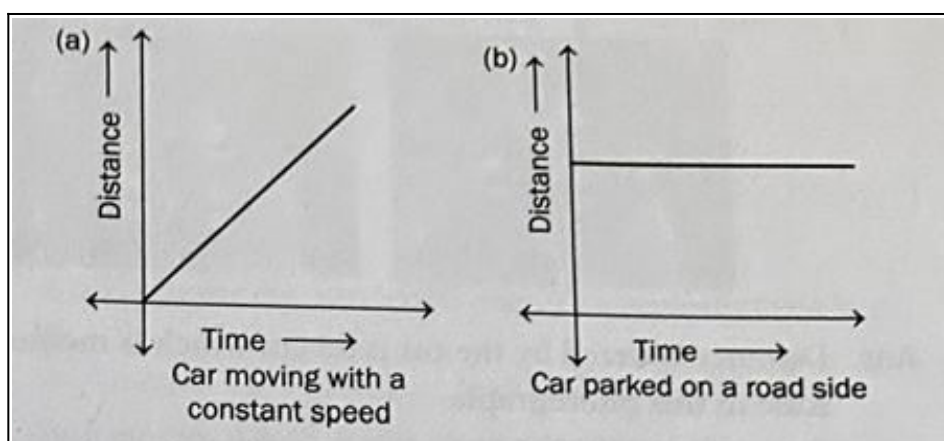
Question 7:

Show the shape of the distance-time graph for the motion in the following cases

(a) A car moving with a constant speed.

(b) A car parked on a road side.

Answer:

(a) Distance / Time → / Car moving with a constant speed
(b) Distance / Time → / Car parked on a road side

Question 8:

Which of the following relations is correct?

(a) Speed = Distance x Time

(b) Speed = $\dfrac{Distance}{Time}$

(c) Speed = $\dfrac{Time}{Distance}$

(d) Speed = $\dfrac{1}{Distance\ X\ Time}$

Answer:

Relation (b) is correct as speed is given by total distance covered by total time taken.

Question 9:

The basic unit of speed is

(a) km/min

(b) m/min

(c) km/h

(d) m/s

Answer:

The basic unit of speed is meter/second or m/s, so option (d) is correct.

Question 10:

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

(a) 100 km

(b) 25 km

(c) 15 km

(d) 10 km

Answer:

Given, speed for first 15 min = 40 km/h

Speed for next 15 min = 60 km/h

As we know that distance = Speed X Time

So, for first 15 min, distance travelled

$$= 40 \text{ X } \frac{15}{60}$$

For second 15 min, distance travelled

$$= 60 \text{ X } \frac{15}{60}$$

So, total distance = 15 + 10 = 25 km

Here is the text from the third image you provided, converted to Word with the specified font and size:

Question 11:

Suppose, the two photographs, shown in two figures had been taken at an interval of 10 s. If a distance of 100 m is shown by 1 cm in these photographs, then calculate the speed of the circled car.

Answer:

Distance covered by the car is 0.5 cm which is measured by scale in this photograph.

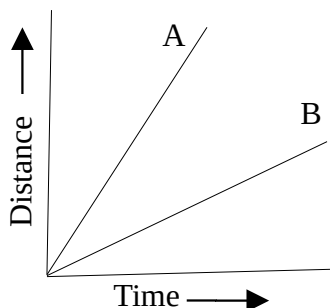Given, 1 cm = 100 m, then 0.5 cm = 50 m

So, distance travelled by the car = 50 m

Time interval = 10 s

$$\text{Speed} = \frac{Distance}{Time} = \frac{50}{10} = 5 \text{ m/s}$$

Question 12:

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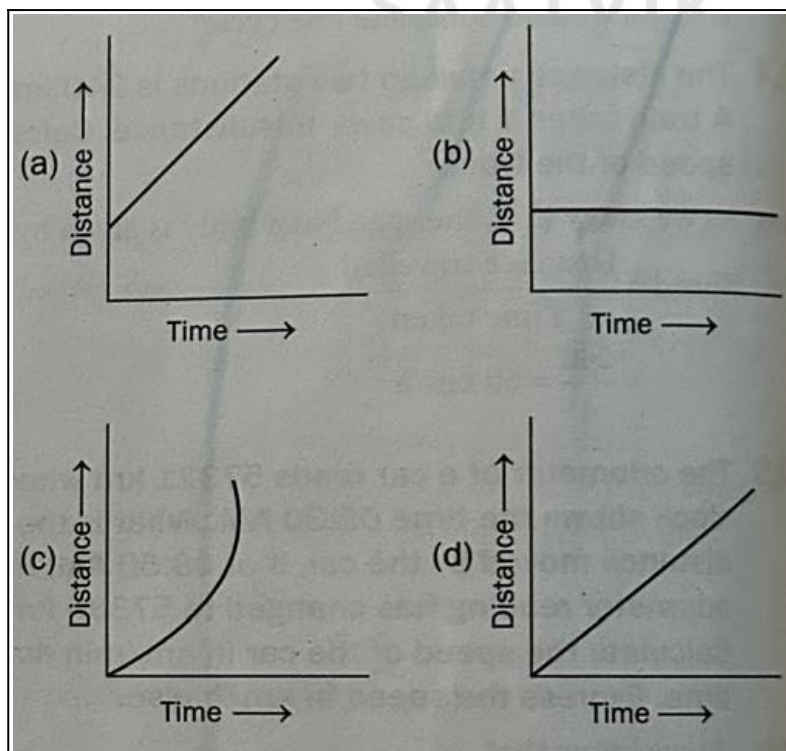

Answer:

As, from the given graph, slope of A is greater than B, i.e. distance covered by A in same time with respect to B is greater. So, A is moving with faster speed than B.

Question 13:

Which of the following distance-time graphs shows a truck moving with speed which is not constant?

Answer:

As, we know that if the distance-time graph is a straight line, the motion is said to be uniform and if the graph between distance-time graph is not straight line, then the motion is said to be non-uniform. So, option (c) is correct.