NCERT Solution

Motion and Time

Exercise

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 a merry-go-round.
(iv) Motion of a child on a see-saw
(v) Motion of the hammer of an electric bell
(vi) Motion of a train on a straight bridge

Answer:

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

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) Distances between two cities are 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.

Answer:

The following statements are incorrect :
(ii) Every object moves with a constant speed.
(iv) The time period of a given pendulum is not constant.
(v) The speed of a train is expressed in m/h.

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

Answer:

No of oscillations = 20
Total time taken to complete 20 oscillations = 32 s

Time period of the pendulum = $\frac{Total\ Time\ Taken}{No.of\ Oscillations}$=$\frac{32}{20} = 1.6\ s$

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

Answer :

The distance between two stations = 240 km
Time taken by the train to cover that distance = 4 hours

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

5. The odometer of a car reads 57321.0 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 57336.0 km? Calculate the speed of the car in km/min during this time. Express the speed in km/h also.

Answer:

Initial reading of car odometer = 57321.0 km
Final reading of car odometer = 57336.0 km
Time at the time of Initial reading = 08:30 AM

Time at the time of Initial reading = 08:50 AM

Distance traveled by the car = 57336.0 km - 57321.0 km
= 15 Km
Time taken by the car to cover distance = 08:50 AM -08:30 AM

= 20 m

Speed of the car in Km/m = $\frac{Distance}{Time} = \frac{15}{20} = 0.75\ km/m$

Speed of the car in Km/h = 0.75 X 60

= 45 Km/h

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

Answer:

Speed of bicycle = 2 m/s

Time taken by Salma to reach school = 15 minutes = 15 X 60 Seconds

Distance between her house and the school = Speed of bicycle x Time taken

= 2 m/s X 15 X 60 s

= 1800 m

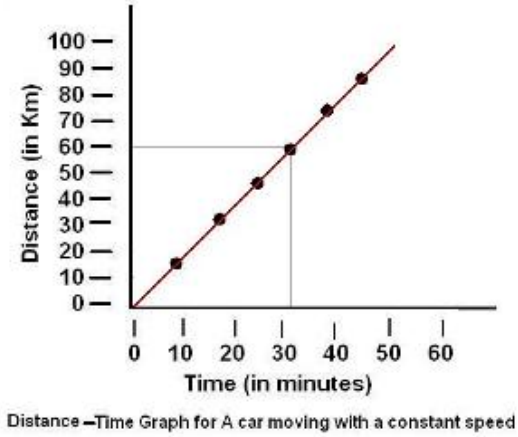
=1.8 Km

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.

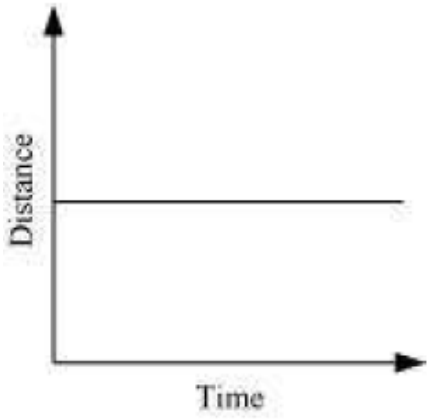
Answer:

(i) A car moving with constant speed covers equal distant in equal interval of time. Such motion of car is represented in given distance-time graph.



Distance –Time Graph for A car moving with a constant speed

(ii) The distance time graph of a car parked on side of road in such that with the increase in time, there is no change in distance as shown in graph.



8. Which of the following relations is correct?

Speed = Distance x Time

Speed = Distance / Time

Speed = Time / Distance

Speed = 1/(Distance x Times)

Answer: ii

Speed = Distance / Time

9. The basic unit of speed is:

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

Answer: (iv) m/s

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

Answer: (ii) 25 km
Distance covered by the car with a speed of 40 km/h in 15 minutes

= Speed X Time
= (40 Km/h /60 minute) X 15 minute
= 10 Km

Distance covered by the car with a speed of 40 km/h in 15 minutes

= Speed X Time
= (60 Km/h /60 minute) X 15 minute
= 15 Km

Total distance covered by the car =(10 + 15)km = 25 Km

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.

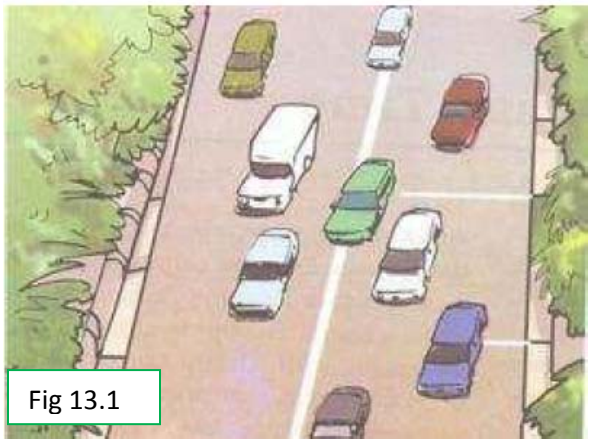


Fig 13.1

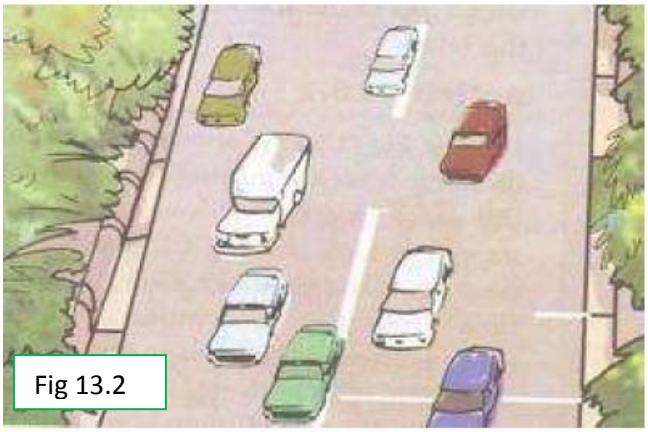


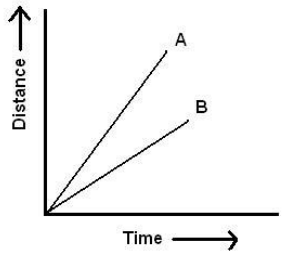
Fig 13.2

Answer:

Distance covered by the blue car (as evident from the photograph) from one white strip to another strip, which is measured by scale 1.3 cm.

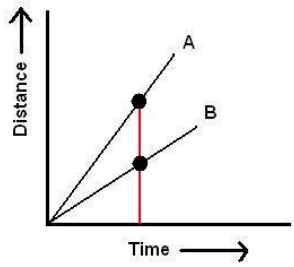
1 cm of distance in photographs	= 100 m
Distance moved by the blue car	=1.3 x 100 m = 130 m
Time taken to cover this distance	= 10 s
Speed of the car	= 130 m /10 s = 1.3 m /s

12. Fig. 13.15 shows the distance-time graph for the motion of two vehicles A and B. Which one of them is moving faster?

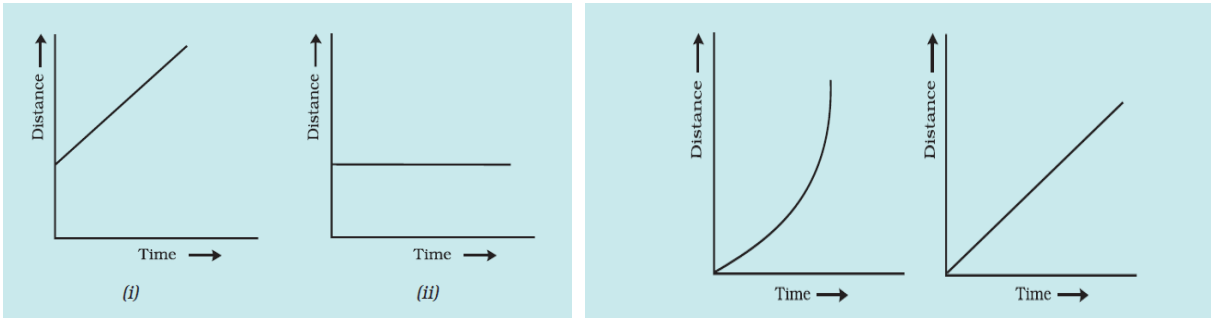


Answer:

The vehicle A is moving faster as distance represented by vertical axis of A is more as compare to B for a given point of time.



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



Answer:

The distance-time graphs number 3 shows a truck moving with speed which is not constant as distance being covered with respect to time is not the same and graph is a curve.