

Board – CBSE

Class – 7

Topic – Motion and Time

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

Ans.

Distance between two stations = 240 km

Time taken to cover this distance = 4 hours

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

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

Ans.

Number of oscillations = 20

Total time taken to complete 20 oscillations = 32 s

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

3. 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.

Ans.

Time taken = 15 min = 15 x 60 = 900 seconds

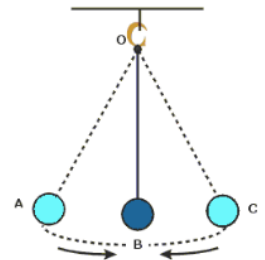
Speed = 2 m/s

Distance = Speed x Time = 2 x 900 = 1800 m = 1800/1000 = 1.8 km

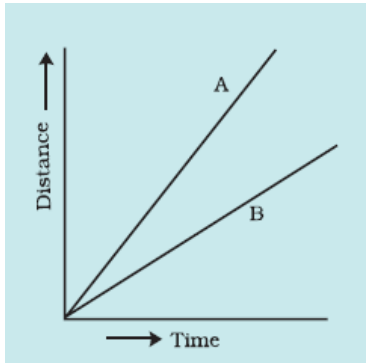
4. When is a pendulum said to have completed one oscillation?

Ans.

The pendulum completes one oscillation when its bob, starting from its mean position B, moves to A, to C and back to B.



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



Ans. Vehicle A is moving faster. The vehicle's speed is greater if it covers a maximum distance in a given interval of time.

6. The odometer of a car reads 57321.0 km when the clock shows the time 08:30 AM. What is the distance moved by 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.

Ans.

$$\text{Distance covered} = 57336 - 57321 = 15 \text{ km}$$

$$\text{Time taken} = 8:50 - 8:30 = 20 \text{ min}$$

$$\text{Speed} = \frac{\text{Distance}}{\text{Time taken}} = \frac{15}{20} = 0.75 \text{ km/h}$$

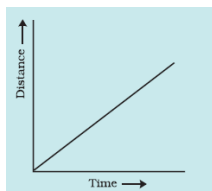
$$\text{Now, convert 20 min into hour} = 20/60 = 1/3 \text{ h}$$

$$\text{Speed} = \frac{\text{Distance}}{\text{Time taken}} = \frac{15}{1/3} = 45 \text{ km/h}$$

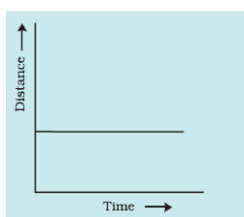
7. Show the shape of the distance-time graph for the motion in the following cases:
- A car moving at a constant speed.
 - A car parked on a side road.

Ans.

A car moving at a constant speed.



A car parked on a side road.



8. A car moves with a speed of 40 km/h for 15 minutes and then 60 km/h for the next 15 minutes. Calculate the total distance covered by the car.

Ans.

Case 1

Speed = 40km/h

Time taken = 15 min = $15/60 = \frac{1}{4}$ hours

Distance = Speed x Time = $40 \times \frac{1}{4} = 10$ km

Case 2

Speed = 60km/h

Time taken = 15 min = $15/60 = \frac{1}{4}$ hours

Distance = Speed x Time = $60 \times \frac{1}{4} = 15$ km

Total Distance = 10 km + 15 km = 25 km

9. Explain how in ancient times, a day, a month and a year were measured?

Ans.

Our ancestors noticed that many events in nature repeat themselves after definite intervals of time. For example, they found that the sun rises every day in the morning. Therefore, the time between one sunrise and the next was called a day. Similarly, a month was measured from one new moon to the next. Finally, a year was fixed as the time taken by the earth to complete one revolution of the sun.

10. Explain uniform motion and non-uniform motion

Ans

If the speed of an object moving along a straight line keeps changing, its motion is said to be non-uniform.

On the other hand, an object moving along a straight line with a constant speed is in uniform motion. In this case, the average speed is the same as the actual speed.

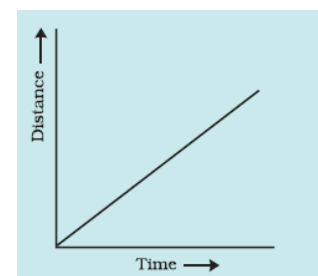
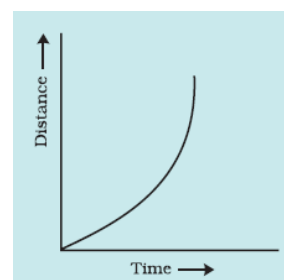
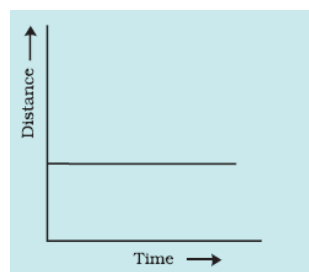
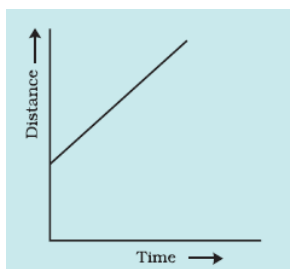
11. What are the points that should be considered while choosing the most suitable scale for drawing a graph?

Ans.

Some of the points to be kept in mind while choosing the most suitable scale for drawing a graph are:

- i. the difference between the highest and the lowest values of each quantity.
- ii. the intermediate values of each quantity, so that with the scale chosen, it is convenient to mark the values on the graph, and
- iii. to utilise the maximum part of the paper on which the graph is to be drawn.

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



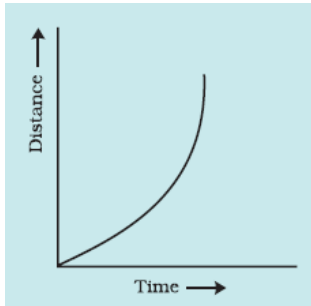
i.

ii.

iii.

iv.

Ans.

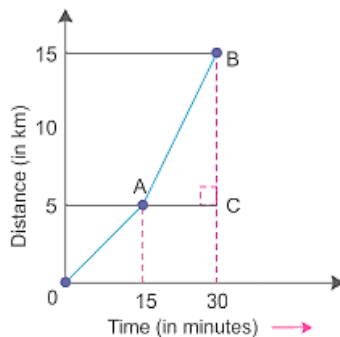


13. What is a simple pendulum?

Ans.

A simple pendulum consists of a small metallic ball or a stone suspended from a rigid stand by a thread. The metallic ball is called the bob of the pendulum.

14. Calculate the speed of the car between points (i) A and origin and (ii) A and B, whose distance-time graph is given below.



Ans

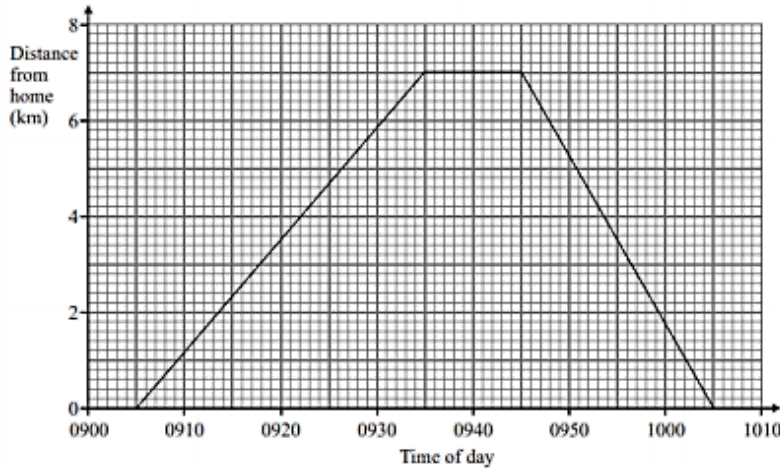
$$(i) \text{Speed between origin and A} = \frac{\text{Distance travelled}}{\text{Time taken}} = \frac{5}{15} = \frac{1}{3} \text{ km/min.}$$

$$(ii) \text{Speed between A and B} = \frac{\text{Distance travelled}}{\text{time taken}} = \frac{15 - 5}{30 - 15} = \frac{10}{15} = \frac{2}{3} \text{ km/min.}$$

15. Anil cycled from his home to the park, waited for a while and then returned home.

a) At what time did Anil leave his home?

- b) How many minutes did Anil wait in the park?
- c) What is the distance from Anil's home to the park?
- d) What was Anil's speed in his journey to the park?
- e) What was Anil's speed in the return journey?



Ans:

- a) Anil left his home at 0905 hrs (9:05 AM)
- b) Anil waited 10 minutes in the park, from 0935-0945hrs (9:35-9:45 AM)
- c) The distance from Anil's home to the park is 7 kilometres
- d) Speed = distance/time
Speed (to the park) = $7\text{km}/30\text{ min}$
 $= 7\text{km}/0.5\text{ hr}$
 $= 14\text{km/hr}$
Time taken is 30 minutes (0905-0935hrs).
- e) Speed = distance/time
Speed for the return journey = $7\text{km}/20\text{min}$
 $= 21\text{ km/hr}$
Time taken for the return journey = 20 min (0945-1005hrs)