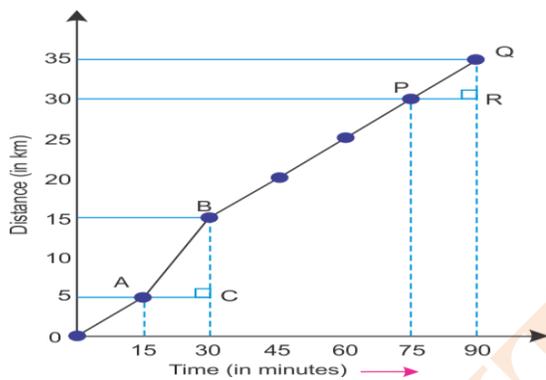


Class: VII
Subject: Physics
Topic: Motion and time
No. of Qs: 20

- Q 1. (i) If 1 cm on a time axis shows 1 min. How many cms will show 1 hour on the axis?
- (ii) Find out the points from the graph where the motion can be uniform from point to point (considering object is travelling in a straight line).



- Sol: (i) 1 min = 1 cm.
- And, 1 hour = 60 min.
- Thus, 1 hour = 60 x 1 cm. (as per axis selection)
- = 60 cm.
- Thus we need a 60 cm long axis.
- (ii) The motion can be uniform from points O to A.
- Then motion can be uniform from points A to B.
- Then it can be said to be uniform from points B to Q.

Q 2. Name some of the instruments used in earlier times to measure time.

Sol: Some of the instruments used in earlier times to measure time are sundial, waterglass, and hourglass.

Q 3. 1 cm on time axis on a distance-time graph denotes 1 hour. What is the time taken by a car whose graph shows reading 4.5 cm to cover a particular distance?

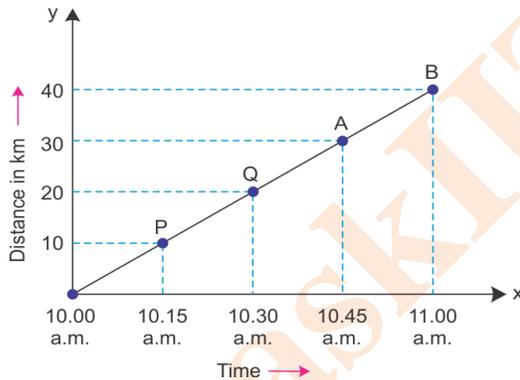
Sol: 1 cm = 1 hour

Therefore, 4.5 cm = $4.5 \times 1 = 4.5$ hour

i.e., 4.5 hour = 4 hour + $(1/2)$ hour

= 4 hour 30 minutes.

Q 4. Calculate the speed of the object at points A and B? At which point the speed is higher?



Sol: Speed at A = Distance / Time = $30 / 45 = 2/3$ km/min.

Speed at B = Distance/Time = $40 / 60 = 2/3$ km/min.

Thus the speed is same at both the points. Hence the body is moving with a constant speed.

Q 5. What do you understand by uniform motion? Give some examples of uniform motion?

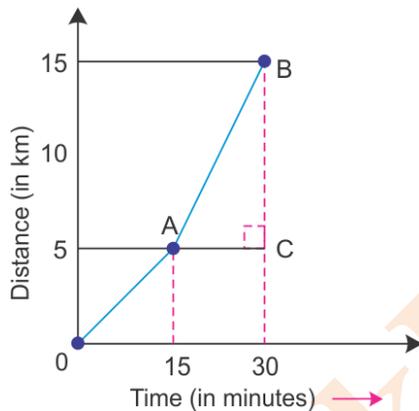
Sol: An object moving in a straight line path with a constant speed along the same direction is said to be in the Uniform Motion

Examples :

(a) A bird flying one way only, along a straight path at a constant speed.

(b) A ball rolling on a smooth horizontal track.

Q 6. Calculate the speed of the car between points (i) A and origin and (ii) A and B whose distance-time graph is given below.



Sol: (i) Speed between origin and A = Distance travelled / Time taken = $5/15 = 1/3$ km/min.

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

Q 7. Name one of the biggest pendulum clocks in the world. Where is it located? How long is its pendulum and what is its time period?

Sol: One of the biggest pendulum clocks in the world is the Big Ben at the House of Parliament in London, U.K. Its pendulum is 4 meters long and it takes only 4 seconds to complete one to and fro oscillation or swing.

Q 8. Why do we take average speed into consideration while calculating distance covered or time taken?

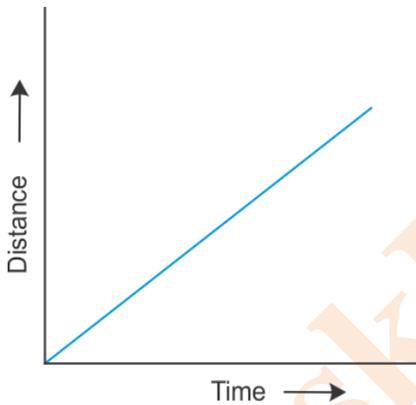
Sol: We take average speed into consideration because during its journey an object may undergo changes in speed, sometimes its speed may increase and sometimes it may decrease. Thus to include the changes and to simplify calculations we assume speed to be the average of the fluctuations happened.

Q 9. Show the shape of the distance-time graph for the motion in the following cases:

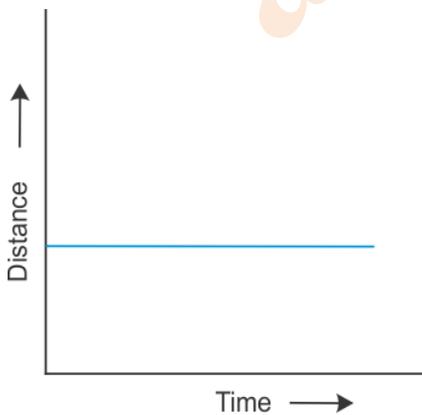
(i) A bike moving with a constant speed.

(ii) A car parked on a road side.

Sol: (i) A bike moving with a constant speed:



(ii) A car parked on a road side:



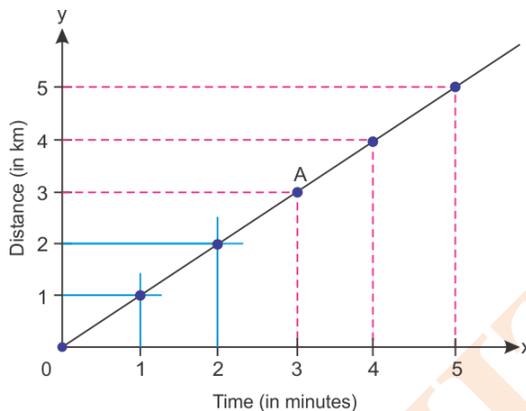
Q 10. Your car moves with a speed of 40 km/h for 10 minutes and then with a speed of 60 km/h for the next 15 minutes. What is the total distance covered by the car?

Sol: Distance covered in first 10 min. = $40 \times (10/60)$ km. = $20/3$ km.

Distance covered in second 15 min. = $60 \times (15/60)$ km. = 15 km.

Total distance = $(20/3) + 15 = 65/3 = 21.66$ km.

Q 11. Find the speed of the car in km/hr between points O and A.



Sol: Total distance travelled = 3 km

Total time taken = 3 minutes

Speed = Total Distance Covered / Total Time Taken
= $3/3 = 1$ km/min

1 min = $1/60$ hr

So, speed = $1/(1/60) = 60$ km/hr

Q 12. What are the common units used to measure time?

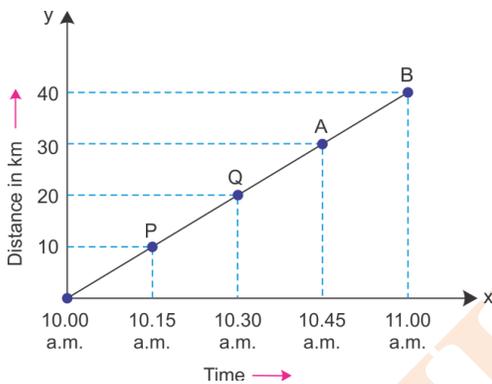
Sol: Common units to measure time are seconds, minutes, hours, days, weeks, and years.

Q 13. What is the definition of time? What is its necessity?

Sol: Time is a moment or duration in which things occur. The knowledge of time is essential for carrying on our daily life activities. For example, our school starts at a particular 'time'. We use our wrist watch to know the time so that we may reach the school on time.

Q 14. (i) Name two types of graphs other than line graphs.

(ii) A body moves along a path. Its distance-time graph is shown below. How much time will it take to cover 100 km distance?



Sol: (i) Bar graph and pie chart.

(ii) Speed = Distance/Time = $40 / 60 = 2/3$ km/min

Therefore, time required to travel 100 km is given by,

Time = Distance/Speed = $100 / (2/3) = 100 \times (3/2) = 50 \times 3 = 150$ minutes

Therefore, Time = 150 minutes = 2 hour 30 minutes

Q 15. (a) Draw the shapes of distance-time graphs for the motion in the following cases:

1. a dog running at a constant speed.
2. a stationary table
3. a car moving with non-uniform speed

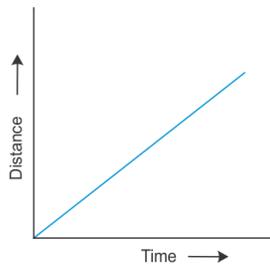
(b) Fill in the blanks:

1. One of the most well known periodic motion is that of a _____.
2. An object moving along a straight line with a constant speed is said to be in _____ motion.

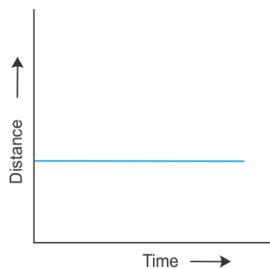
Sol

(a)

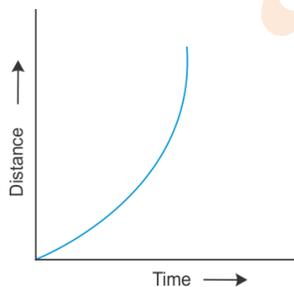
1.



2.



3.



(b)

1. simple pendulum
2. uniform motion

Q 16. Which of the two is moving faster (a) A car going over a distance of 100 km in 5 hours, or (b) A train covering a distance of 300 km in 6 hours?

Sol: Speed of the car = $100/5 = 20$ km/h.

Speed of the train = $300/6 = 50$ km/h.

Hence train is moving faster than the car.

Q 17. (i) Why do we need to measure time?

(ii) A dog runs behind you for 30 minutes and the distance covered by the dog is 3 km. What should be your minimum speed if dog was not able to bite you?

Sol: (i) We need to measure time in order to keep track of our day to day activities. For eg. Meeting with the doctor, Attending our class at time etc.

(ii) Your speed should be greater than that of the dog. Thus we will find speed of the dog and will come to know the minimum of your speed.

Speed = Distance covered / Time taken

$$= 3 / 30 = 1/10 \text{ km/min.}$$

Therefore, Speed = $(1/10) \times (1000/60) = 100/60$ m/s.

Thus you must run at least above the speed of $(5/3)$ m/s.

Q 18. Calculate the time period of pendulum which oscillates 100 times in an hour.

Sol: Total time taken = 1 hour = 60 minutes = 3600 seconds

Total no. of oscillations = 100

Therefore, Time Period of the pendulum = $3600/100 = 36$ seconds

Q 19. Two boys ran in a race of 10 km. First boy ran with a constant speed 2 km/h for the whole race, while the second boy ran at 1 km/h for half of the race and at 5 km/h for the other half. Who won the race?

Sol: Total time taken by first boy = $10/2 = 5$ h.

Total time taken by second boy = $(5/1) + (5/5) = 5 + 1 = 6$ h.

Thus first boy won the race.

Q 20. If one wants to change the time period of a pendulum, what should be done to do so?

Sol: As the time period of a pendulum depends on its length, thus one should change the length of the pendulum to change its time period.

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