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# CH = Motion and Time

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

- i) Motion of your hands while running.  
→ Oscillatory motion.
- ii) Motion of a horse pulling a cart on a straight road.  
→ Straight line motion.
- iii) Motion of a child in a merry-go-round.  
→ Circular 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.



Q2 Which of the following are not correct?

i) The basic unit of time is second.

→ This statement is correct.

ii) Every object moves with a constant speed.

→ This statement is incorrect.

iii) Distances between two cities are measured in kilometers.

→ This statement is correct.

iv) The time period of a given pendulum is constant.

→ This statement is correct.

v) The speed of a train is expressed in m/h.

→ This statement is incorrect.

Q3 A simple pendulum takes 32 s to complete 20 oscillations. What is the time period of the pendulum?

→ No. of oscillations = 20.

Total time taken to complete 20 oscillations = 32 s



$$\Delta \text{Time period} = \frac{\Delta \text{Total time taken}}{\text{No. of oscillations}}$$

$$= \frac{32}{20} = 1.6 \text{ seconds}$$

Q4) The distance between two stations is 240 km. A train takes 4 hours to cover this distance. Calculate the speed of the train.

→ Distance between two stations = 240 km.

Δ Time taken = 4 hours

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

Q5) 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 had changed to 57336.0 km? Calculate the speed of the car in km/min during this time. Express the speed in km/h also.

→ Initial reading of odometer = 57321.0 km  
Final reading of odometer = 57336.0 km

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



Car starts at 8:30 Am and stops 8:50 am  
 $\Delta$  Time taken by car to cover the distance = 20 min

$$\Delta \text{ speed} = \frac{\text{Distance}}{\Delta \text{ time}} = \frac{15}{20} = 75 \text{ km/minute}$$

$$60 \text{ min} = 1 \text{ hour}$$

$$1 \text{ ————— } \frac{1}{60} \text{ hour}$$

$$20 \text{ min} \text{ ————— } \frac{1}{60} \times 20 = \frac{1}{3} \text{ hr}$$

$$= \frac{15}{20} = 75 \text{ km/minute}$$

$$\text{Speed} = \frac{\text{Distance}}{\Delta \text{ time}} = \frac{15 \text{ km}}{\frac{1}{3}} = \frac{15 \times 3}{1} = 45 \text{ km/hr}$$

Q6 Salma takes 15 minutes from her house to reach her school on a bicycle. If the bicycle had a speed of 2 m/s, calculate the speed of distance between her house and the school.

$$\rightarrow \Delta \text{ time taken by Salma} = 15 \text{ min} \\ = 15 \times 60 = 900 \text{ second}$$

$$\text{Speed} = \frac{\text{Distance}}{\Delta \text{ time taken}}$$



Distance = Speed  $\times$  Time taken

Speed = 2 m/sec

Distance = 2 m  $\times$  900  
 = 1800 meter

1000 meter = 1 Km

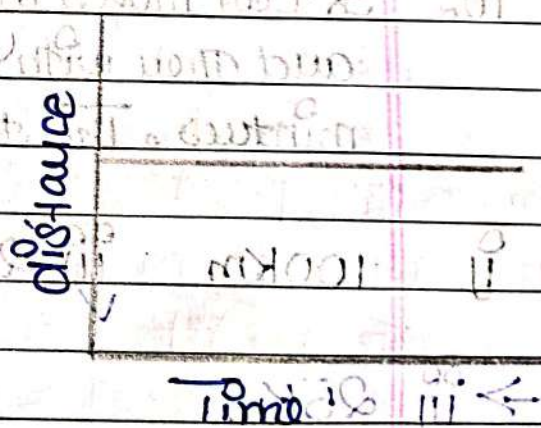
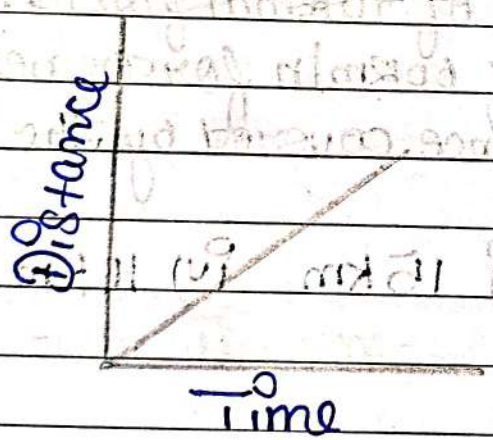
1 meter =  $\frac{1}{1000}$

1800 meter =  $\frac{1 \times 1800}{1000} = 1.8 \text{ Km}$

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Q1 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.





8. Which of the following relations is correct :-

i)  $speed = Distance \times Time$     ii)  $speed = \frac{Distance}{Time}$

iii)  $speed = \frac{Time}{Distance}$     iv)  $speed = \frac{1}{Distance \times Time}$

→ ii)  $speed = \frac{Distance}{Time}$

9. The basic unit of speed is :-

i)  $Km/min$     ii)  $m/min$     iii)  $Km/h$     iv)  $m/s$

→ iv)  $m/s$

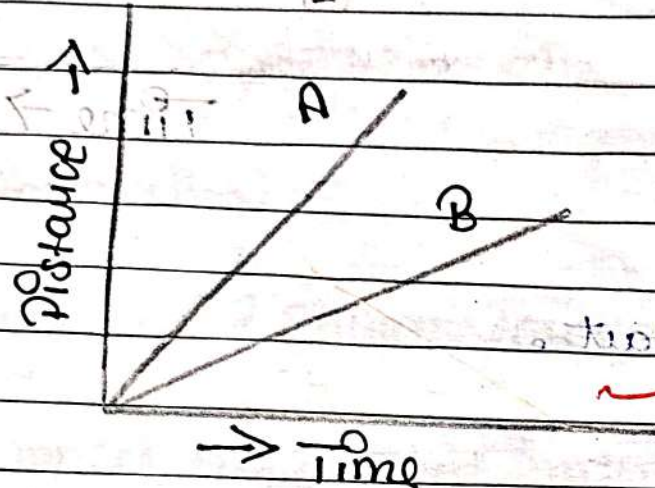
10. A car moves with a speed of  $90 Km/h$  for 15 minutes and then with a speed of  $60 Km/h$  for the next 15 minutes. The total distance covered by the car is :-

i)  $100 Km$     ii)  $25 Km$     iii)  $15 Km$     iv)  $10 Km$

→ ii)  $25 Km$

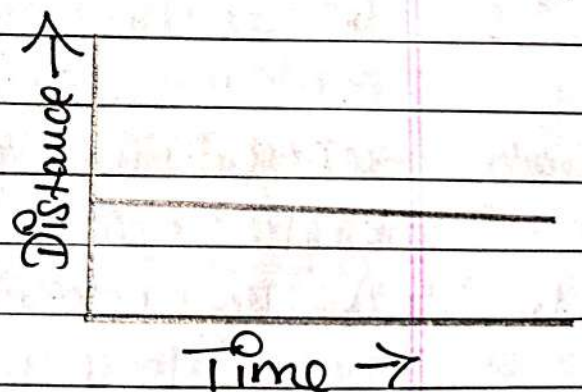
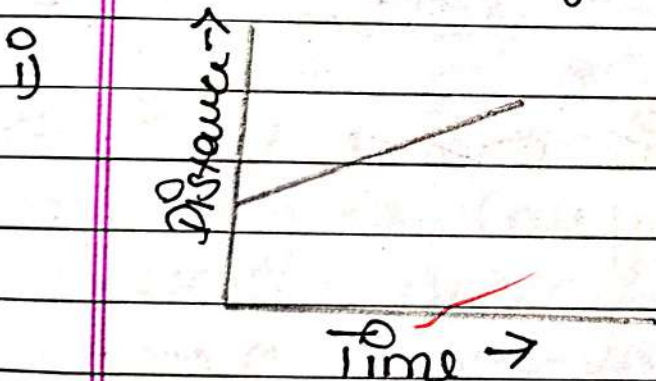


Q12 Fig. 9.15. Shows the distance - time graph for the motion of two vehicles A and B. Which one of these is moving faster?

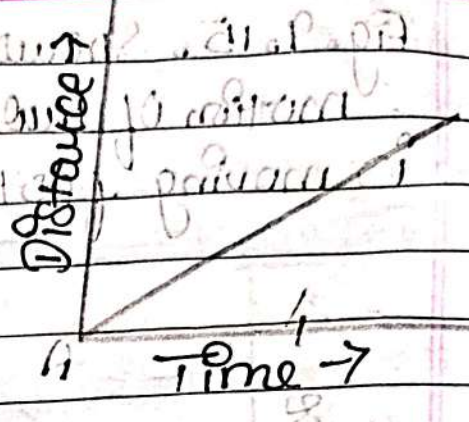
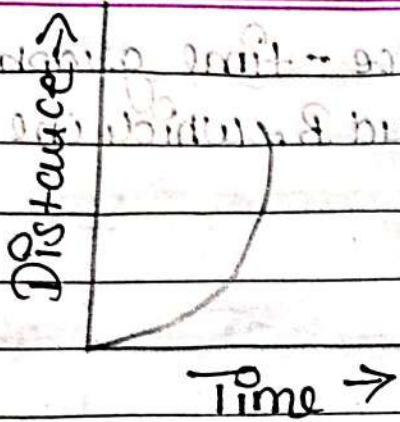


→ A is faster than B.

Q13 Which of the following distance-time graph shows a truck moving with speed which is not constant?



iii)



→ iii) is not constant.

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