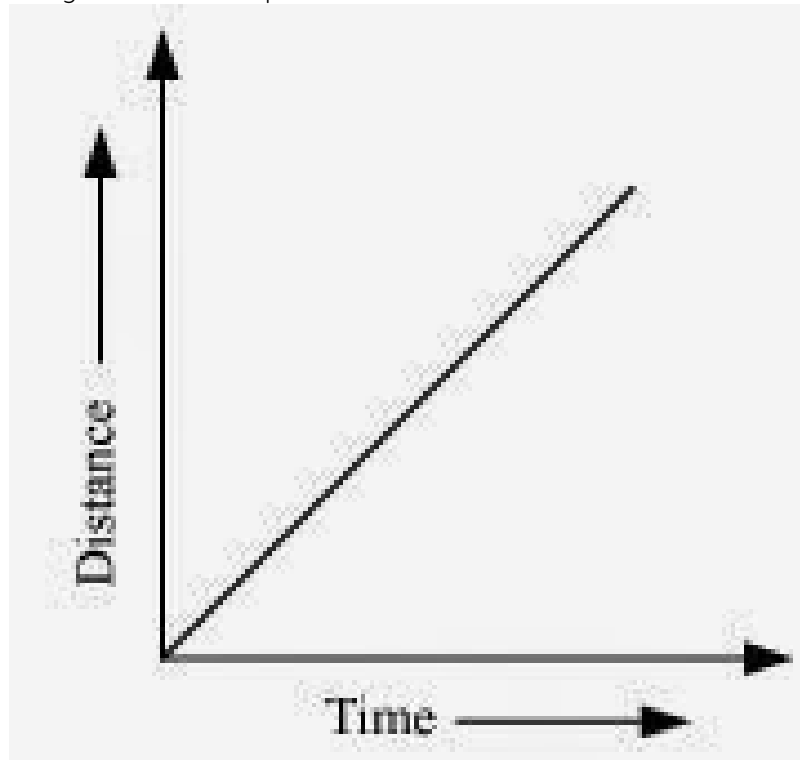




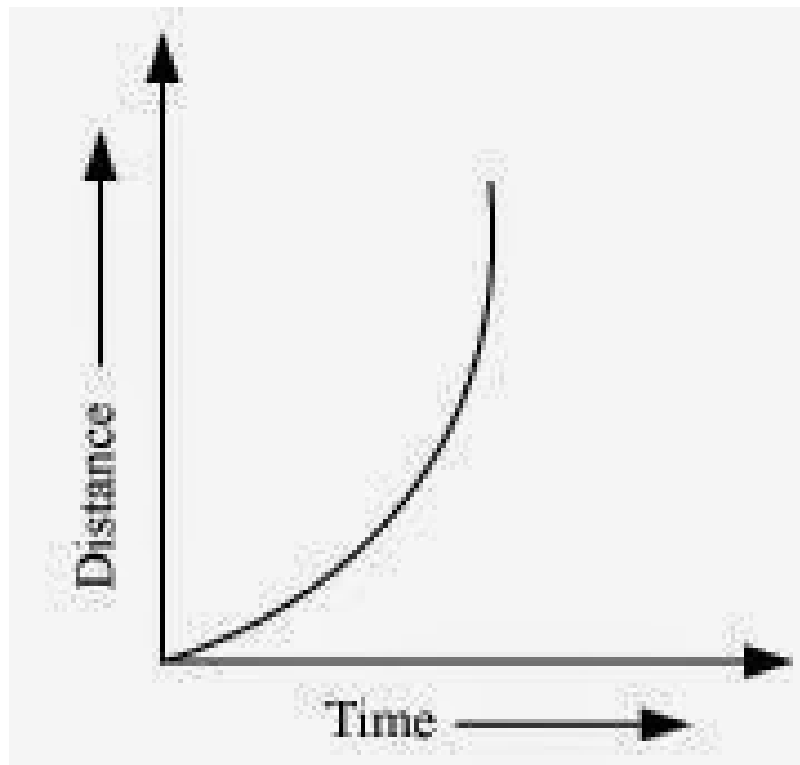
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1. What is the nature of the distance - time graphs for uniform and non-uniform motion of an object?

Answer: When the motion is uniform, the distance time graph is a straight line with a slope.

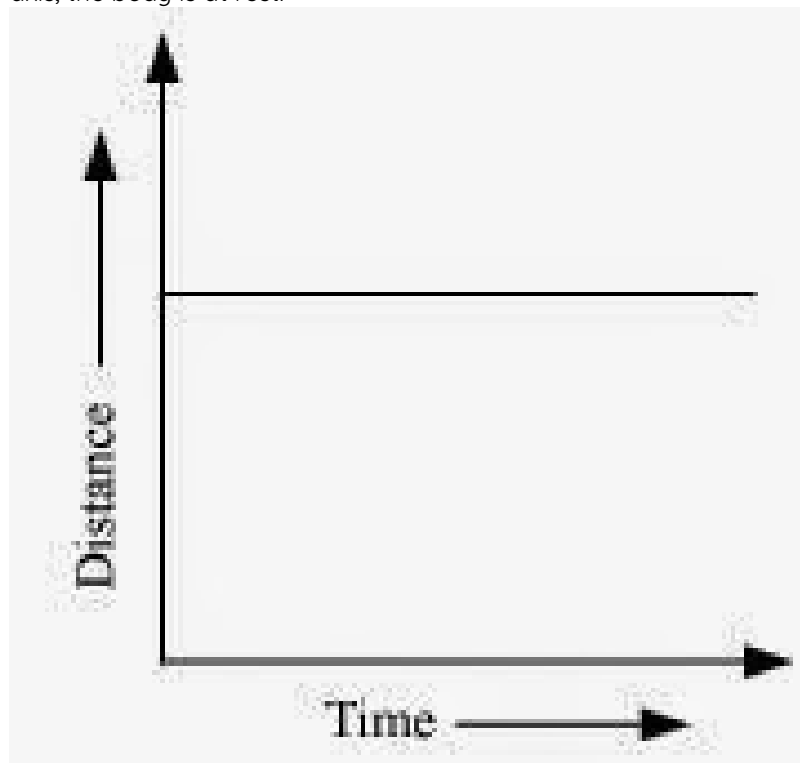


When the motion is non uniform, the distance time graph is not a straight line. It can be any curve.



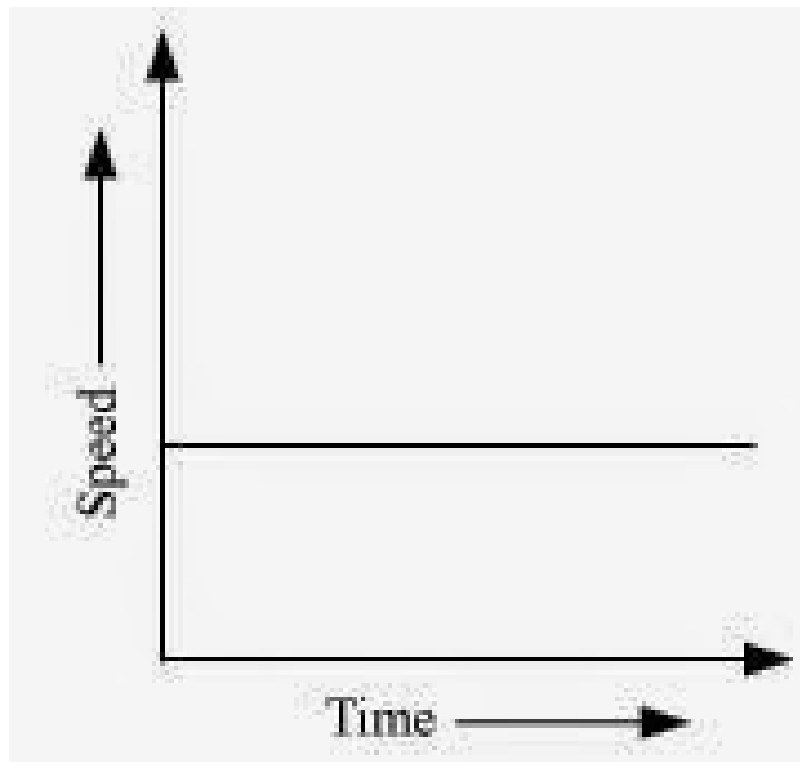
2. What can you say about the motion of an object whose distance - time graph is a straight line parallel to the time axis?

Answer: If distance time graph is a straight line parallel to the time axis, the body is at rest.



3. What can you say about the motion of an object if its speed - time graph is a straight line parallel to the time axis?

Answer: If speed time graph is a straight line parallel to the time axis, the object is moving uniformly.



4. What is the quantity which is measured by the area occupied below the velocity -time graph?

Answer: The area below velocity-time graph gives the distance covered by the object.

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1. A bus starting from rest moves with a uniform acceleration of  $0.1 \text{ m s}^{-2}$  for 2 minutes. Find (a) the speed acquired, (b) the distance travelled.

Answer:

Initial speed of the bus,  $u = 0$

Acceleration,  $a = 0.1 \text{ m/s}^2$

Time taken,  $t = 2 \text{ minutes} = 120 \text{ s}$

(a)  $v = u + at$

$$v = 0 + 0.1 \times 120$$

$$v = 12 \text{ ms}^{-1}$$

(b) According to the third equation of motion:

$$v^2 - u^2 = 2as$$

Where,  $s$  is the distance covered by the bus

$$(12)^2 - (0)^2 = 2(0.1) s$$

$$s = 720 \text{ m}$$

Speed acquired by the bus is  $12 \text{ m/s}$ .

Distance travelled by the bus is  $720 \text{ m}$ .

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2. A train is travelling at a speed of  $90 \text{ km h}^{-1}$ . Brakes are applied so as to produce a uniform acceleration of  $-0.5 \text{ m s}^{-2}$ . Find how far the train will go before it is brought to rest.

Answer:

Initial speed of the train,  $u = 90 \text{ km/h} = 25 \text{ m/s}$

Final speed of the train,  $v = 0$  (finally the train comes to rest)

Acceleration =  $-0.5 \text{ m s}^{-2}$

According to third equation of motion:

$$v^2 = u^2 + 2as$$

$$(0)^2 = (25)^2 + 2(-0.5) s$$

Where,  $s$  is the distance covered by the train

$$s = \frac{25^2}{2(0.5)} = 625 \text{ m}$$

The train will cover a distance of 625 m before it comes to rest.

3. A trolley, while going down an inclined plane, has an acceleration of  $2 \text{ cm s}^{-2}$ . What will be its velocity 3 s after the start?

Answer:

Initial Velocity of trolley,  $u = 0 \text{ cm s}^{-1}$

Acceleration,  $a = 2 \text{ cm s}^{-2}$

Time,  $t = 3 \text{ s}$

We know that final velocity,  $v = u + at = 0 + 2 \times 3 \text{ cm s}^{-1}$

Therefore, The velocity of train after 3 seconds =  $6 \text{ cm s}^{-1}$

4. A racing car has a uniform acceleration of  $4 \text{ m s}^{-2}$ . What distance will it cover in 10 s after start?

Answer:

Initial Velocity of the car,  $u = 0 \text{ m s}^{-1}$

Acceleration,  $a = 4 \text{ m s}^{-2}$

Time,  $t = 10 \text{ s}$

We know Distance,  $s = ut + (1/2) at^2$

Therefore, Distance covered by car in 10 second =  $0 \times 10 + (1/2) \times 4 \times 10^2$

$= 0 + (1/2) \times 4 \times 10 \times 10 \text{ m}$

$= (1/2) \times 400 \text{ m}$

$= 200 \text{ m}$

5. A stone is thrown in a vertically upward direction with a velocity of  $5 \text{ m s}^{-1}$ . If the acceleration of the stone during its motion is  $10 \text{ m s}^{-2}$  in the downward direction, what will be the height attained by the stone and how much time will it take to reach there?

Answer:

Given Initial velocity of stone,  $u = 5 \text{ m s}^{-1}$

Downward of negative Acceleration,  $a = 10 \text{ m s}^{-2}$

We know that  $2as = v^2 - u^2$

Therefore, Height attained by the stone,  $s = \frac{0^2}{5^2} \times (-10) \text{ m}$

$= \frac{-25}{-20} \text{ m}$

$= 1.25 \text{ m}$

Also we know that final velocity,  $v = u + at$

or, Time,  $t = \frac{v - u}{a}$

Therefore, Time,  $t$  taken by stone to attain the height,  $s = \frac{0 - 5}{-10} \text{ s}$

$= 0.5 \text{ s}$

\*\*\*\*\* END \*\*\*\*\*