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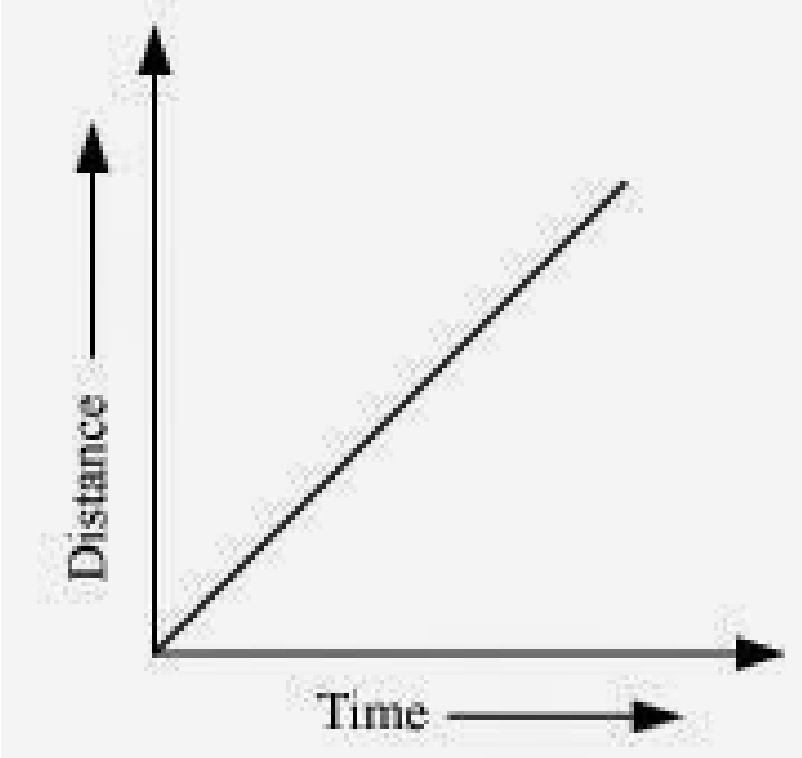
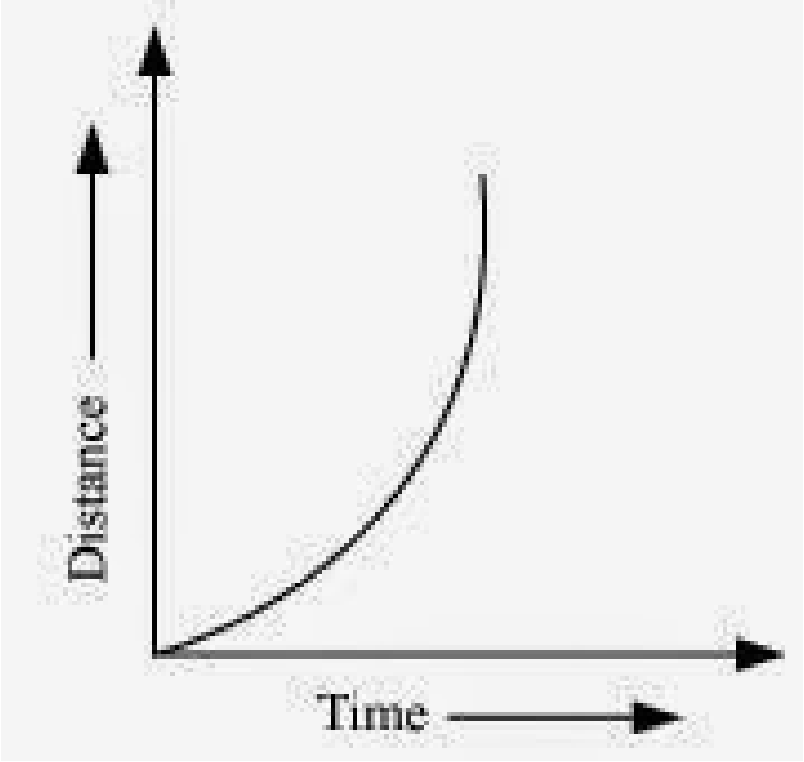
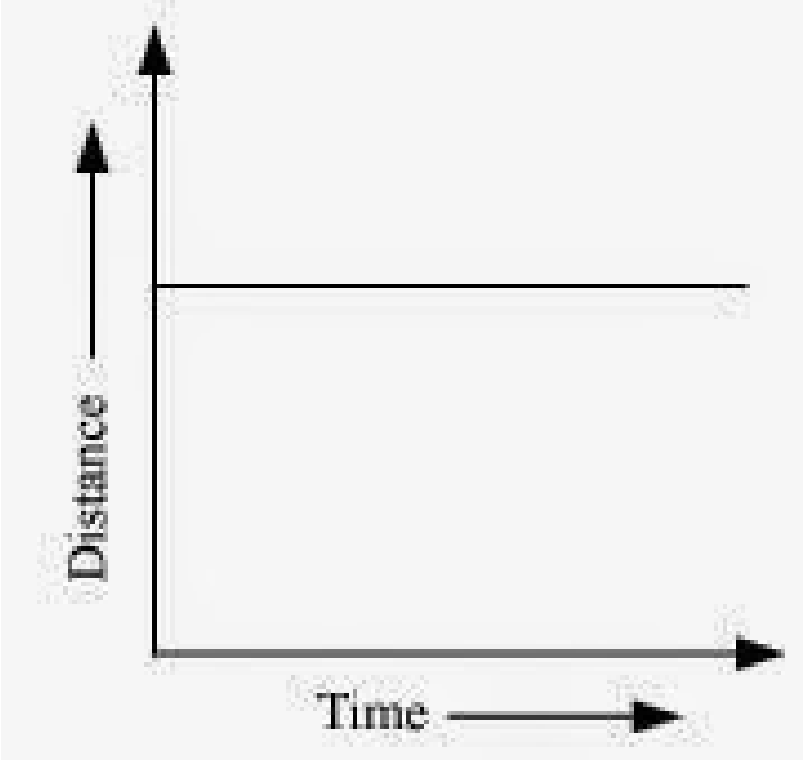
1. What is the nature of the distance - time graphs for uniform and non-uniform motion of an object?
Answer: When the motion is uniform,the distance time graph is a straight line with a slope.



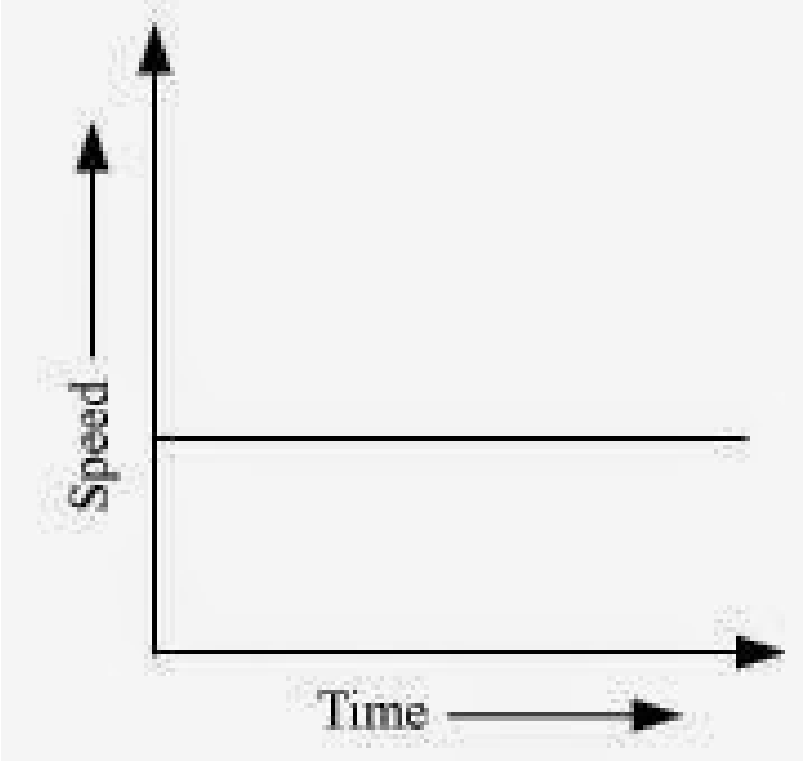
When the motion is non uniform, the distance time graph is not a straight line.It can be any curve.



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 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 m/s^2
Time taken, t = 2 minutes = 120 s
(a) v= u + at
v= 0 + 0.1 × 120
v= 12 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 m
Speed acquired by the bus is 12 m/s.
Distance travelled by the bus is 720 m.

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2. A train is travelling at a speed of 90 km h^{-1}. Brakes are applied so as to produce a uniform acceleration of –0.5 m s^{-2}. Find how far the train will go before it is brought to rest.
Answer:
Initial speed of the train, u = 90 km/h = 25 m/s
Final speed of the train, v = 0 (finally the train comes to rest)
Acceleration = - 0.5 m s^{-2}
According to third equation of motion:
v^2= u^2+ 2 as
$(0)^2$= $(25)^2$+ 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 cm s^{-2}. What will be its velocity 3 s after the start?
Answer:
Initial Velocity of trolley, u = 0 cms^{-1}
Acceleration, a = 2 cm s^{-2}
Time, t = 3 s
We know that final velocity, v= u + at = 0 + 2 x 3 cms^{-1}
Therefore, The velocity of train after 3 seconds = 6 cms^{-1}

4. A racing car has a uniform acceleration of 4 m s^{-2}. What distance will it cover in 10 s after start?
Answer:
Initial Velocity of the car, u=0 ms^{-1}
Acceleration, a= 4 m s^{-2}
Time, t= 10 s
We know Distance, s= ut + (1/2) at^2
Therefore, Distance covered by car in 10 second= 0 × 10 + (1/2) × 4 × 102
= 0 + (1/2) × 4 × 10 × 10 m
= (1/2) × 400 m
= 200 m

5. A stone is thrown in a vertically upward direction with a velocity of 5 m s^{-1}. If the acceleration of the stone during its motion is 10 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 m s^{-1}
Downward of negative Acceleration, a= 10 m s^{-2}
We know that 2 as= v^2- u^2

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

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

= 1.25 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= $\frac{0-5}{-10\ s}$

= 0.5 s

********** END **********