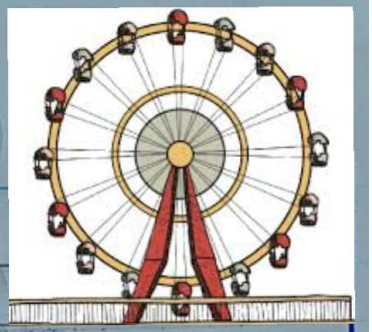
Fazal Academy



Conceptual Questions

1. In a park, children are enjoying a ride on big wheel as shown. what kind of motion the big wheel has and what kind of motion the riders have?

→ Motion of Big wheel is rotatory Motion.
Big wheel is rotating about its axis, So the motion of the Wheel is rotatory motion.

→ Motion of riders is Circular Motion.
Children are not rotating, they are moving in a Circular path, So the motion of the Children is Circular motion.

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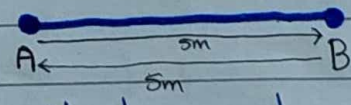
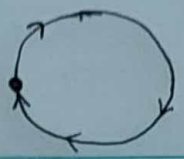
2. A boy moves for Some time, give two Situations in which his displacement is zero but Covered distance is not zero?
If Starting and ending points are Same then displacement will be zero.

Case 1: When a boy moves on a Straight line from A to B and Comes back from B to A then



his displacement is zero because Starting and ending points are Same but distance is not zero which is equal to $5+5=10m$.

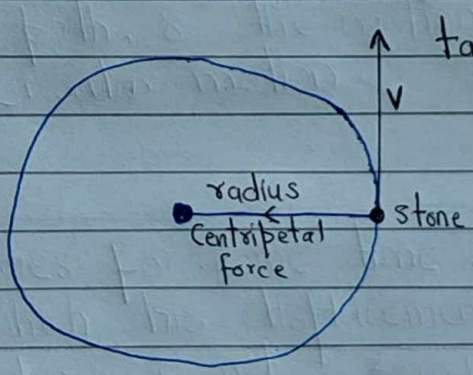
Case 2: When a boy moves on a Circular path then his displacement is zero because starting



and ending points are same but distance is not zero which is equal to $2\pi r$.

3. A stone tied to string is whirling in circle, what is direction of its velocity at any instant?

When a stone moves in a circle then the direction of its velocity is always tangent to the circle which is perpendicular to the direction of centripetal force or radius of circle.



4. Is it possible to accelerate an object without speeding it up or slowing it down?

Yes, it is possible.

Example: When an object moves in a circular path, the object has acceleration due to change in direction.

→ In this case, the object moves with constant speed i.e its speed neither increases nor decreases.

Just for understanding

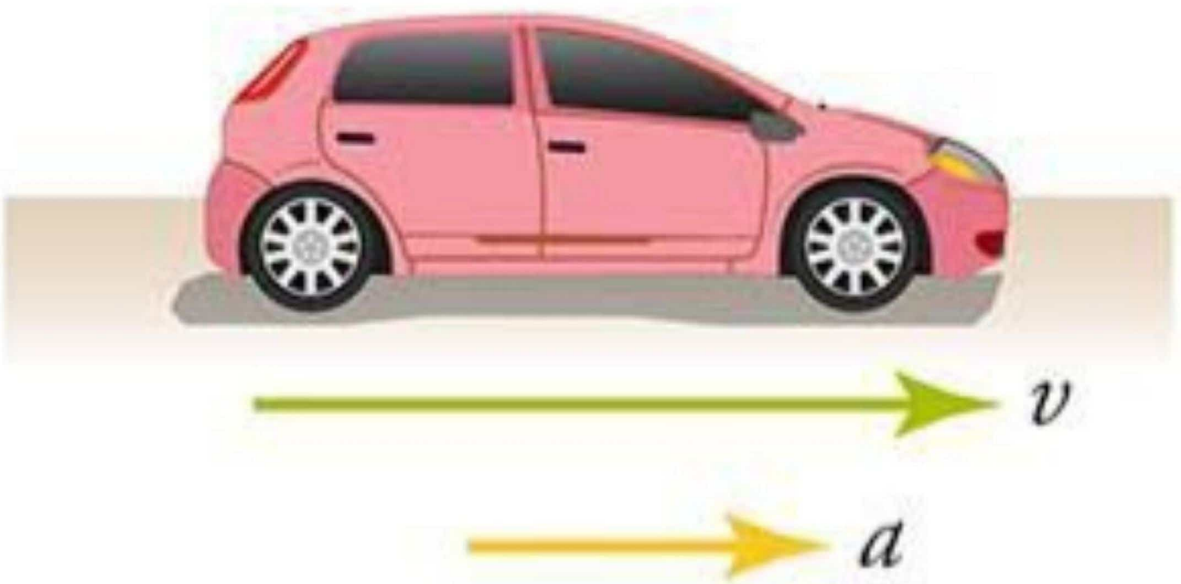
$$\text{acceleration} = \frac{\text{Change in velocity}}{\text{time}}$$

Velocity = Vector = magnitude + Direction

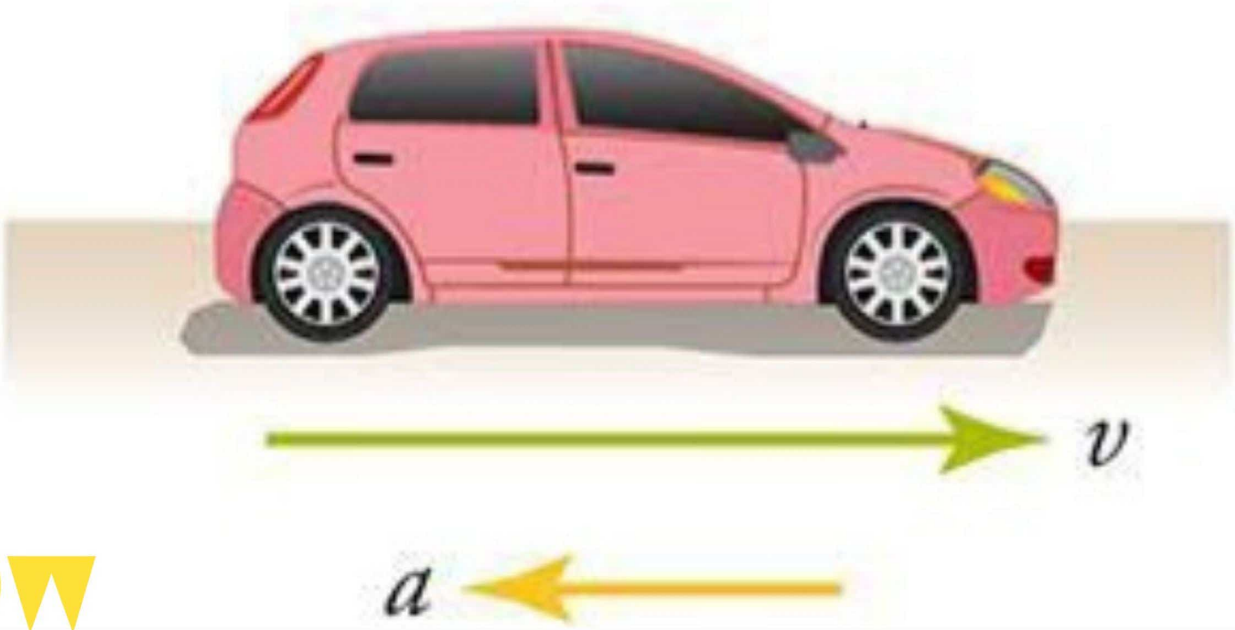
Same

Change

(a)



(b)



5. Can a Car moving towards right have direction of acceleration towards left?

Yes,

→ If a Car is moving towards right then direction of velocity and acceleration is same i.e towards right.

→ When we apply brakes on the Car then its speed decreases and deceleration is produced in it. In this case the direction of velocity is towards right but the direction of acceleration is towards left.

6. With the help of daily life examples, tell the situations in which

a. acceleration is in the direction of motion,

b. acceleration is against the direction of motion,

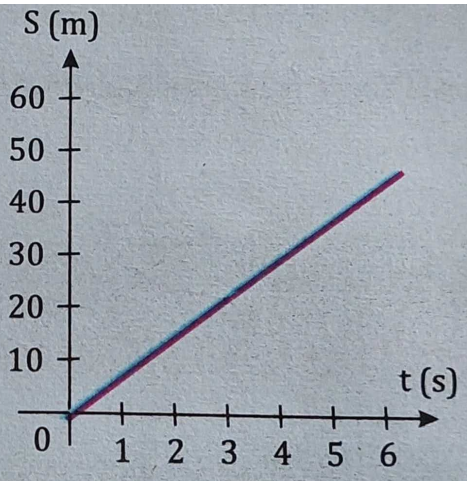
c. acceleration is zero and body is in motion.

a. If a Car is moving on a straight line with increasing speed then the acceleration is in the direction of motion.

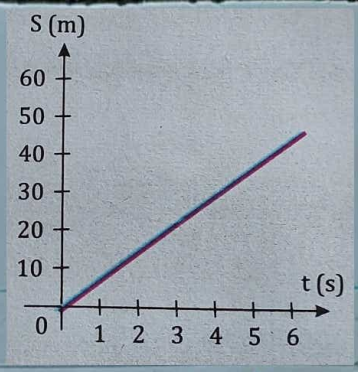
b. When we apply brakes then the speed of the Car decreases and deceleration is produced. In this Case the acceleration is against the direction of motion.

c. If the Car is moving with uniform speed then its velocity does not change with time. So in this case acceleration is zero but the Car is in motion.

7. Examine distance-time graph of a motorcyclist (as shown), what does this graph tell us about the speed of motorcyclist? Plot the velocity-time graph for it?



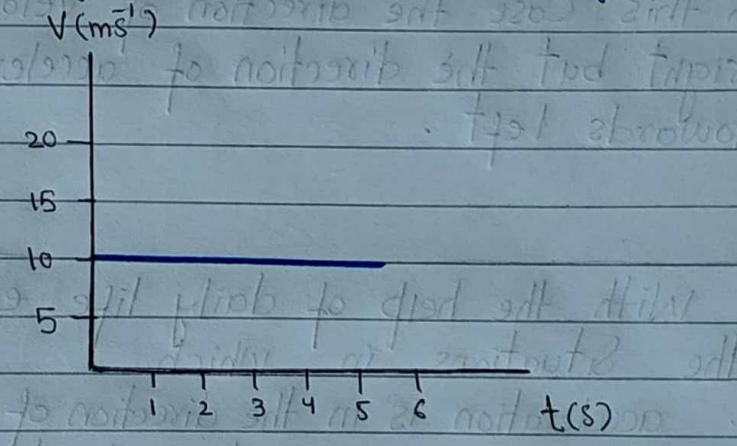
DISTANCE - TIME GRAPH



7:

→ This graph tells us that, the speed (velocity) of motorcyclist is uniform (constant), because it covers equal distance (displacement) in equal intervals of time.

→ Velocity-time graph for the above motion (moving with uniform velocity)



8. Which Controls in the Car Can produce acceleration or deceleration in it?

(i) Accelerator: Accelerator in the Car increases the speed of the Car when pressed, So it produces acceleration in the Car.

(ii) Brakes: Brakes in the Car decrease the Speed of the Car when pressed, So brakes produce deceleration in the Car.

9. If two Stones of 10 kg and 1 kg are dropped from a 1 km high tower. which will hit the ground with greater velocity? which will hit the ground first? (Neglect the air resistance).

→ If two Stones of 10kg and 1kg dropped from a 1 km high tower then the heavier stone will hit the ground with greater velocity. Because the force with which Earth attract the body towards its Centre is equal to the weight of the object. So the stone having mass 10 kg will hit the ground with greater velocity.

→ If we neglect air resistance then both the Stones will reach on the ground at Same time.

10. A 1 kg Steel ball is dropped (from rest) and another is thrown downward with velocity of $5\ ms^{-1}$, which will have greater acceleration? (Neglect the air resistance).

There are two Steel balls each of which is 1 kg. one is dropped (from rest) and other is thrown downward with $5\ ms^{-1}$. Both of these ball are moving under the force of gravity with an acceleration $g = 10 ms^{-2}$. So both of balls will have Same acceleration independent of their masses.