

## MOTION IN A STRAIGHT LINE

1. A ball hits a wall with a velocity of 30m/s & rebounces with the same velocity. What is the change in its velocity?
2. A ball is thrown straight up. What is its velocity & acceleration at the top?
3. The displacement of a body is given to be proportional to the cube of time elapsed. What is the nature of the acceleration of the body?
4. Two balls of different masses are thrown vertically upwards with same initial speed. Which one will rise to greater height?
5. An object is in uniform motion along a straight line. What will be position time graph for the motion of the object if: (i)  $X_0 = +ve$ ,  $v = +ve$  (ii)  $X_0 = +ve$ ,  $v = -ve$ . Where  $X_0$  and  $v$  represent initial position and uniform velocity respectively.
6. Two trains 120m & 80m in length are running in opposite directions with velocities 42km/h & 30km/h. In what time they will completely cross each other?
7. A body covers the first half of the distance between two places at a speed of 40km/h and the second half of the journey at 60km/h. What is the average speed of the car?
8. The displacement (in metre) of a particle moving along X axis is given by  $x = 3t^2 + 5t + 5$ . Calculate:
  - (i) Instantaneous velocity at  $t = 2s$ ,
  - (ii) Average velocity between  $t = 2s$  &  $t = 4s$ ,
  - (iii) Instantaneous acceleration at  $t = 2s$ .
9. On a foggy day two drivers spot each other when they are just 80m apart. They are travelling at 72km/h & 60km/h, respectively. Both of them applied brakes retarding their cars at the rate of 5m/s. Determine whether they avert collision or not.
10. A body starting from rest accelerates uniformly along a straight line at the rate of  $10m/s^2$  for 5s. It moves for 2 seconds with uniform velocity of 50m/s. Then it retards uniformly and comes to rest in 3s. Draw velocity –time graph of the body and find the distance travelled by the body.