# BRAIN INTERNATIONAL SCHOOL

**SUBJECT: PHYSICS**          **CLASS-XI**          **June, 2021**

### CH: 3-(MOTION IN STRAIGHT LINE)

1. A lift is coming from 8th floor and is just about to reach 4th floor. Taking ground floor as origin and positive direction upwards for all quantities, which one of the following is correct?

   (a) $x < 0, v < 0, a > 0$     (b) $x > 0, v < 0, a < 0$     (c) $x > 0, v < 0, a > 0$   (d) $x > 0, v > 0, a < 0$

2. The displacement of a particle is given by $x = (t - 2)^2$ where $x$ is in metres and $t$ in seconds. The distance covered by the particle in first 4 seconds is

   (a) 4 m          (b) 8 m          (c) 12 m          (d) 16 m

3. A bird is tossing (flying to and fro) between two cars moving towards each other on a straight road. One car has a speed of 18 Km/h while the other has the speed of 27km/h. The bird starts moving from first car towards the other and is moving with the speed of 36km/h and when the two cars were separated by 36 km. What is the total distance covered by the bird? What is the total displacement of the bird?

4. A man runs across the roof-top of a tall building and jumps horizontally with the hope of landing on the roof of the next building which is of a lower height than the first. If his speed is 9 m/s, the (horizontal) distance between the two buildings is 10 m and the height difference is 9 m, will he be able to land on the next building? (take $g = 10$ m/$s^2$)

5. A motor car moving at a speed of 72km/h cannot come to a stop in less than 3.0 s while for a truck this time interval is 5.0 s. On a highway the car is behind the truck both moving at 72km/h. The truck gives a signal that it is going to stop at emergency. At what distance the car should be from the truck so that it does not bump onto (collide with) the truck. Human response time is 0.5s.

6. A man is standing on top of a building 100 m high. He throws two balls vertically, one at $t = 0$ and other after a time interval (less than 2 seconds). The later ball is thrown at a velocity of half the first. The vertical gap between first and second ball is +15 m at $t = 2$ s. The gap is found to remain constant. Calculate the velocity with which the balls were thrown and the exact time interval between their throw.

7. The speed time graph of a particle moving along a fixed direction is shown in figure. Obtain the distance travelled by the particle between (i) t = 0 to 10 s (ii) t = 2 to 6 s. What is the average speed of the particle in intervals in (i) and (ii) ?
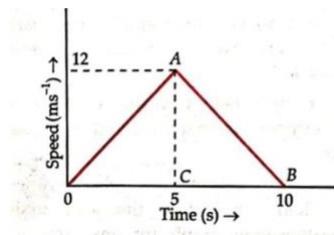


8. Two towns A and B are connected by a regular bus service with a bus leaving in either direction every T min. A man cycling with a speed of 20 $kmh^{-1}$ in the direction A to B notices that a bus goes past him every 18 min in the direction of his motion, and every 6 min in the opposite direction. What is the period T of the bus service and with what speed (assumed constant) do the buses ply on the road?