CBSE TEST PAPER-01

CLASS - XI PHYSICS (Kinematics)
Topic: - Motion in Straight Line [ANSWERS]

Ans1:   When the particle moves with uniform velocity and along a straight line.
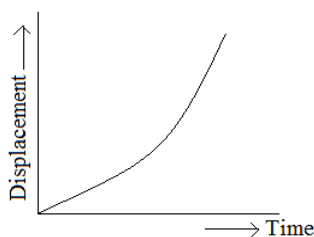
Ans2:   Both the balls will rise to a greater height.

Ans3:   If $Va = Vb = V (say)$

Then $\overrightarrow{Vab} = V\vec{a} - V\vec{b} = \vec{V} - \vec{V} = 0$

Ans4:   (1) It is a vector quantity having both magnitude and direction.
(2) Displacement of a given body can be positive, negative or zero.

Ans5:   The graph is parabolic in shape

Ans6: $vav = \dfrac{2v_1v_2}{v_1 + v_2} = \dfrac{2 \times 60 \times 40}{60 + 40} = 48 km / hr.$
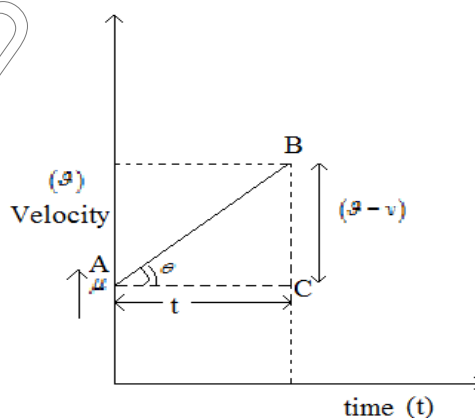
Ans7:   Slope of $v - t$ graph

$\tan\theta = \dfrac{v - v}{t}$

$But \tan\theta = acceleration(a)$

$\Rightarrow a = \dfrac{v - v}{t}$

$v - v = at$

$\boxed{v = v + at}$

Ans8: $x = t^3 - 6t^2 - 15t + 40$

$v = \dfrac{dx}{dt} = \left(3t^2 - 12t - 15\right) \frac{m}{s}$

$a = \dfrac{dv}{dt} = \left(6t - 12\right) \frac{m}{s^2}$

(a) $3t^2 - 12t - 15 = 0$

   $3t^2 - 15t + 3t - 15 = 0$

   $3t(t-5) + 3(t-5) = 0$

   $(3t+3)(t-5) = 0$

   Either $t = -1$ or $t = 5$

   Time cannot be negative

   $\therefore$ t = 5 seconds.

(b) Position at t = 5 s   At t = 0 s

   $x = (5)^3 - 6(5)^2 - 15(5) + 40$ $x = 40m$

   $x = -60m$

Displacement at t = 5 s and t = 0s

   $s = x_5 - x_0$

   $x_5 = -60m$

   $x_0 = 40m$

   $s = -60 - 40$

   $\boxed{s = -100m}$

(c) Acceleration at t = 5s

   $a = 6(5) - 12$ $\boxed{a = 18m/s^2}$

   $a = (30 - 12)$

Ans9:   (1) Displacement

   Diving (0 – 4) s

   S_1 = area of OAB s

   $S_1 = 15 \times 4 = 60$ m

   (2) Displacement (0 – 8s)

   $S_2 = S_1$ + area (CDEF)

   $S_2 = 60 + (-5) \times 4 = 60 - 20 = 40m$

   (3) Displacement (0 – 12s)

   $S_3 = S_1$ + area (CDEF) + area (FGHI)

   $S_3 = 60 - 20 + 40 = 80m$

Distance	Displacement
1. Distance is a scalar quantity	1. Displacement is a vector quantity.
2. Distance is always positive	2. Displacement can be positive negative or zero.