DPP – 4

SOLUTION

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1. $v = \frac{dx}{dt}$

$\int dt = \int \frac{dx}{v} = \int v^{-1}dx$

$\int_{t1}^{t_2} dt = \int v^{-1}dx =$ area under of v^{-1}/x graph

$= \frac{1}{2} \times 8 + \frac{1}{2} \times 8 \times \frac{3}{2}$

$\Delta t = 4 + 6 = 10sec$

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

$v = 3t^2 - 12t - 15$

$v = 0 \qquad t^2 - 4t - 5 = 0$

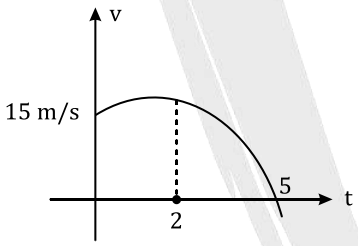
$t^2 - 5t + t - 5 = 0$

$t(t-5)1(t-5) = 0$

$t = 5sec \quad , \quad t = -1sec$

$a = 6t - 12$

$a = 0,\ t = 2\ sec$



$t = 0\ v = 15m/s$

$t = 5,\ \ v = 0$

$t = 2sec$

$a = 0$

3. $v^2 = u^2 + 2as$

$v^2 - u^2 = 2as$

$\frac{v^2 - u^2}{2s} = a$

from graph

$v^2 = 3600(\ km/hr)^2$

$v^2 = 900(\ km/hr)^2$

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$-\left[\frac{3600-900}{2\times0.6}\right] = a$

$-\frac{2700}{1\cdot2} = a$

$a = -2250$

4. at 0 to t

Slope of v-t graph is constant that's mean slope of $x - t$ graph is increases at $t = t$ to $t +$ velocity is constant & negative that's mean acceleration is zero f slope of x-t graph is constant and negative

"so option D is correct"

5. At $t = t_2$ particle at origin.

$t = t_3 \rightarrow$ velocity is negative.

6. $t = 0$ $v = 0$

$t = R$ $v = R$

$a_{avg} = \frac{R-0}{R-0} = 1\frac{m^2}{s}$

7. at $t = t_4$

because Area of acceleration - time graph gives change in velocity.

OR

In given graph acceleration is always + ive.

8. Option D.

9. v-t graph is st-line.

by symmetry

$t = 2$ &$t = 4$ speed of particle is same.

(A)

Area of v-t graph gives

Displacement.

(c)

10. V is maximum when $a = 0$

$\frac{dv}{dt} = 0$

So B is correct option

$t = 2$

$\frac{d^2v}{dt^2}$ is -ive