IGE MAYOWA BOLADE — CIVIL ENGINEERING.

18/ENG03/1030. — ENG 234. ASSIGNMENT.

Fig 12-3

A particle travels along a straight line with a velocity of v $v = (4t - 3t^2)$ m/s where t is in seconds. Determine the position of the particle when $t = 4$ s. $s = 0$ when $t = 0$

Fig 12-4

A particle travels along a straight line with a speed $v = (6\cos^2 - 8t)$ m where t is in seconds. Determine the acceleration of the particle when $t = 2$ s.

Fig 12-7

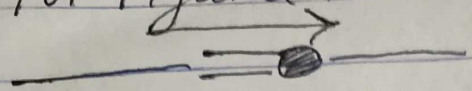
A particle moves along a straight line such that its acceleration is $a = (4t^2 - 2)$ m/s^2, where t is in seconds. Origin, and when $t = 2$ s, it is 20m to the left of the Origin. Determine the position of the particle when $t = 4$ s.

Fig 12-8

A particle travels along a straight line with a velocity of $v = (20 - 0.05s^2)$ m/s, where s is in meters. Determine the acceleration of the particle at $s = 15$ m.

1)

For Figure 12.3



when

$v = (4t - 3t^2)$ m/s

$s = \int v\,dt$

$s = \int (4t - 3t^2)\,dt$

$= 2t^2 - t^3$

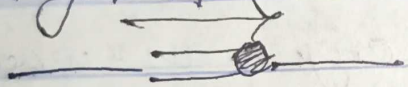
when $t = 4$ s

$s = 2(4)^2 - (4)^3$

$s = +32 - 64$

$s = -32$ m,

2) Fig. 12.4



$V = (0.5t^3 - 8t)$ m/s

$A = dv/dt$

$dv/dt = 3(0.5)t^2 - 8$

$= 1.5t^2 - 8$

$A = dv/dt$ at $t = 2$

$A = 1.5(2)^2 - 8$

$A = 6 - 8 = -2$ m/s.

For figure 12-7 (8).

$A = (4t^2 - 2)\ m/s^2$

$V = \int A\,dt$

$V = \int 4t^2 - 2$

$V = \frac{4t^3}{3} - 2t + C$

$S = \int V\,dt$

$S = \int \frac{4t^3}{3} - 2t + C$

$S = \frac{4t^3}{12} - \frac{2t^2}{2} + Ct$

$P = \frac{1}{3}t^4 - t^2 + Ct + K$

When $t = 0$, $P = 2$

$-2 = \frac{1}{3}(0)^4 - (0)^2 + C(0) + K$

$K = -2$

When $t = 2$, $P = 20$, $K = -2$

$-20 = (\frac{1}{3})(2)^4 - 2^2 + C(2) - 2$

$-20 = -(0.7) + 2C$

$C = -9.9$

$P = \frac{1}{3}t^4 - t^2 - 9.9t - 2$

$P = 28.71m$

4.) For Figure 12.8 (c)

$V = (20 - 0.5s)\,m/s$

$dt = \frac{ds}{v}$ and $dt = \frac{dv}{a}$

$a = dv/dt$, $\frac{dv}{dt} = dv/ds \cdot ds/dt$

$\frac{dv}{ds} = -0.15$, $\frac{ds}{dt} = (20 - 0.5s^2)$

$A = (-0.15)(20 - 0.05s^2)$

But $s = 15$

$A = (-0.1 \times 15)(20 - 0.05(15)^2)$

$A = -13.125\,m/s^2$ //