OGUN MARYANN OKANILEMEN
18/ENG04/057
Electrical Engineering
Engineering mechanics

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

$s = \int v \cdot dt$

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

$s = 2t^2 - t^3 + c$

$s = 2(4)^2 - 4^3 + 0$

$s = 32 - 64 + 0$

$s = -32m$

$\therefore -32m$ Left of the x-axis

2) $v = (0.5t^3 - 8t)\ m/s$

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

$a = 1.5t^2 - 8$

at $t = 2$

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

$a = -2m/s$ (deceleration)

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

$t = 0 \quad s = 2m$

$t = 2 \quad s = 20m$

$t = 4 \quad s = ?$

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

$dv = a \cdot dt$

$dv = (4t^2 - 2t) \cdot dt$

$v = \frac{4t^3}{3} - 2t + c$

$v = \frac{ds}{dt}$

$ds = v \cdot dt$

$= \left(\frac{4t^3}{0} - 2t + C_1\right) dt$

$s = \frac{4t^4}{12} - \frac{2t^2}{2} + C_1 t + C_2$

At $t = 0$ $\quad s = 2m$

$2 = \frac{4(0)^4}{12} - \frac{2(0)^2}{2} + C_1(0) + C_2$

$C_2 = -2$

At $t = 2s$, $\quad s = 20m$

$-20 = \frac{4(2)^4}{12} - \frac{2 \times 2^2}{2} + C_1(2) - 2$

$-18 = 5.33 - 4 + 2C_1$

$C_1 = \frac{-18 - 5.30 + 4}{2}$

$C_1 = -9.665$

$s = \frac{4t^4}{12} - 2\frac{t^2}{2} + 2(-9.665)$

$s = \frac{4(4)^4}{12} - \frac{2 \times 4^2}{2} + 2(-9.665)$

$s = 85.33 - 16 - 19.324$

$s = 50.006m$

4) $v = 20 - 0.05s^2$

$a = v \cdot (dv/ds)$

$\frac{dv}{ds} = 0.15$

$a = (20 - 0.05s^2) \cdot (0.1)s$

$a = 2s - 0.005s^3$

$a = 2(15) + 0.005(15)^3$

$a = -30 + 16.875$

$a = -13.125m^2$