ADENIRAN MUSIRAFFEMAT ADEDAMOLA
COMPUTER ENGINEERING
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Fig 2.3

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

$S = \int v\,dt$

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

$= 2t^2 - t^3$

when $t = 4$

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

$= 32 - 64$

$S = -32m$

Fig 2.4

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

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

$\frac{dv}{dt} = 3(0.5)t^2 - 8$

$= 1.5t^2 - 8$

$A = \frac{dv}{dt}\Big|_{t=2} = 1.5(2)^2 - 8$

$= 6.8 = -2m/s$

Fig 2.8

$v = (20 - 0.55^2)\,m/s$

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

$\frac{dv}{dt} = \frac{dv}{ds} \cdot \frac{ds}{dt}$

$\frac{dv}{ds} = -0.15 \cdot , \frac{ds}{dt} = (20 - 0.55^3)$

$A = (0.15)(20 - 0.055^3)$

when $S = 15$

$A = (-0.1(15)(20 - 0.05(5^3))$

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

Fig 2.7

$A = (4t^2 - 2)\,ms^{-2}$

$v = \int A\,dt$

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

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

$S = \int v\,dt$

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

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

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

when $t = 0$, $P = 2$

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

$K = 2$

when $t = 2$, $P = 20$, $K = 2$

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

$-20 = -0.7 + 2C$

$C = 9.7$

$P = \frac{1}{3}t^4 - t^2 - 9.7t - 2$

when $t = 4$

$P = \frac{1}{3}(4)^4 - 4^2 - (9.7 \times 4)$

$P = 28.7m$