

2/SMAN HABIBA LAALI
 BIOMEDICAL ENGINEERING
 18/ENG08/025

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

$v = (4t - 8t^2)$

$(4t - 8t^2) dt = ds$

$\int_{t_1}^{t_2} (4t - 8t^2) dt$

$= \int_{s_1}^{s_2} ds$

$\left[4 \times \frac{t}{2} - 8 \times \frac{t^3}{3} \right]_{t_1}^{t_2} = [s]_{s_1}^{s_2}$

$[2 \times t^2 - \frac{8}{3} t^3]_0^4 = s_2 - 0$

$s_2 = [2 \times 4^2 - \frac{8}{3} \times 4^3] + 0$

$s_2 = -82m$

3. $a = (4t^2 - 2) \text{ m/s}^2$

$v = \int (4t^2 - 2) \text{ m/s}^2 dt$

$v = \frac{4}{3} t^3 - 2t - 6$

$s = \int (\frac{4}{3} t^3 - 2t + C_1) dt$

$s = \frac{1}{3} t^4 - \frac{2}{2} t^2 + C_1 t + C_2$

at $t=0, s=-2 = C_2$

at $t=2, s=-20, \text{ etc}$

at $t=4$

$s(4) = \frac{1}{3} (4)^4 - (4)^2 + (-2)(4) + (-9.7)$

$= 28.7m$

(a) $y = 0.5t^3 - 2t$

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

$a = 1.5t^2 - 2$

$t=2$

$a = -2 \text{ m/s}^2$

(4.) $y = (20 - 0.05s^2) \text{ m/s}$

$\frac{dt}{ds} = \frac{dy}{v} \quad \& \quad \frac{dt \cdot dv}{v}$

$\frac{ds}{4} = \frac{dy}{9}$

$a = \frac{4dv}{ds}$

$dv = 0.05s \times 2ds$

$= 0.1s ds$

$a = (20 - 0.05s^2) \cdot (0.15) ds$

$a = -2s + 0.005s^3$

$a(s=15) = -2 \times 15 + 0.005 \cdot 15^3$

$a = -13.125 \text{ m/s}^2$