

MUHAMMAD ISHAQ HARUN

19/ENG06/067

Mechanical Engineering

ENG 235

Assm (s-s) = a

$\bar{f} 12-3$

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

$$s = ? \quad \text{at } t = 4s$$

NB :- $s = 0, t = 0$

$$s = \int v dt$$

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

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

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

$$\text{at } s = 0, t = 0, c = 0$$

$$s = 2(4)^2 - (4)^3 - 0 = 32 - 64 = -32 \text{ m}$$

$$= 32 - 64 = -32 \text{ m}$$

$\bar{f} - 4$

$$v = (0.5t^3 - 8t) \text{ m/s}$$

$$a = ? \text{ when } t = 2s$$

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

$$a = \frac{d}{dt} (0.5t^3 - 8t) = 1.5t^2 - 8$$

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

$$\text{at } t=2$$

$$a = 1.5(2)^2 - 1$$

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

$$\bar{r} = 7$$

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

$$\text{at } t=0, s = -2 \text{ m}$$

$$\text{at } t=2, s = -20 \text{ m} \quad (= v)$$

$$s = ? \text{ at } t=4$$

$$v = \int (4t^2 - 2) dt$$

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

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

$$= \frac{4t^4}{3 \times 4} - \frac{2t^2}{2} + ct + A$$

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

$$\text{at } t=0, s = -2$$

$$-2 = \frac{0^4}{3} - 0^2 + c(0) + A$$

$$\therefore A = -2$$

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

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

$$-20 = \frac{2^4}{3} - 2^2 - 2 + 2c$$

$$-20 = \frac{16}{3} - 4 - 2 + 2c$$

$$-20 = \frac{16}{3} - 6 + 2c$$

$$-20 = \frac{16}{3} - 6 + 2c$$

$$c = \frac{-19.33}{2}$$

$$c = \underline{\underline{-9.67}}$$

$$\therefore \text{at } t=4, s=?$$

$$s = \frac{4^4}{3} - 4^2 + 4(-9.67) - 2$$
$$= \underline{\underline{28.65 \text{ m}}}$$

$\bar{v} = ?$

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

$$a = ? \quad \text{at } s = 15 \text{ m}$$

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

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

$$\frac{dv}{ds} = -0.1s$$

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

$$= -2s + 5 \times 10^{-3} s^3$$

$$= -2(15) + 5 \times 10^{-3} (15)^3$$

$$= \underline{\underline{-13.13 \text{ m/s}^2}}$$