

TAIWO AJIBOLA EMMANUEL

4) 19/ENGG01/024

CHEMICAL ENGR.

MECHANICS ONLINE ASSIGNMENT



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

$$s = ? \quad t = 4\text{s}, \quad s = 0 \text{ when } t = 0$$

$$v = \frac{ds}{dt} = (4t - 3t^2)$$

$$s = \int v$$

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

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

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

$$\text{When } s = 0 \quad t = 0$$

$$0 = 2(0)^2 - (0)^3 + c$$

$$c = 0$$

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

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

$$s = 32 - 64$$

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



Fig 12-4

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

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

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

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

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

$$a \text{ @ } t = 2\text{s}$$

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

$$a = 6 \text{ m/s}^2$$

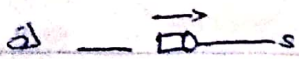


Fig 12-8

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

$$\text{① } t=0 \quad s=2 \text{ m}$$

$$\text{② } t=2 \quad s=20 \text{ m}$$

$$\text{③ } t=4 \quad s=?$$

$$a = \frac{dv}{dt} = (4t^2 - 2)$$

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

$$v = \left(\frac{4t^3}{3} - 2t + C_1 \right) \text{ m/s}$$

$$v = \frac{ds}{dt} = \left(\frac{4}{3}t^3 - 2t + C_1 \right) \text{ m/s}$$

$$\frac{ds}{dt} = \frac{4}{3}t^3 - 2t + C_1$$

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

$$s = \left(\frac{1}{3}t^4 - t^2 + C_1t + C_2 \right) \text{ m}$$

$$s = \frac{1}{3}t^4 - t^2 + C_1t + C_2$$

$$\text{① } t=0 \quad s=-2 \text{ m}$$

$$s = \frac{1}{3}t^4 - t^2 + C_1t + C_2$$

$$-2 = \frac{1}{3}(0)^4 - (0)^2 + C_1(0) + C_2$$

$$C_2 = -2$$

$$\text{② } t=2 \quad s=-20 \text{ m}$$

$$-20 = \frac{1}{3}(2)^4 - (2)^2 + C_1(2) - 2$$

$$2C_1 = -20 + \frac{2}{3}$$

$$2C_1 = -19.33$$

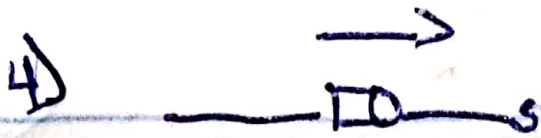
$$C_1 = -9.67$$

$$s = \frac{1}{3}t^4 - t^2 - 9.67t - 2$$

$$\text{③ } t=4$$

$$s = \frac{1}{3}(4)^4 - (4)^2 - 9.67(4) - 2$$

$$s = 28.65 \text{ m}$$



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

$$a = ? \quad \text{① } s = 15\text{m}$$

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

$$a = (20 - 0.05s^2) \frac{d}{dt}$$

$$a = -0.1s$$

$$a \quad \text{② } s = 15\text{m}$$

$$a = -0.1 \times 15$$

$$a = -1.5 \text{ m/s}^2$$