

RAJI UMIMI - PALMA ONI ZE

18/08/2020

BIOMEDICAL ENGINEERING

① F12-3

Solution

$$V = (4t - 3t^2)$$

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

$$ds = v dt$$

$$\int_0^s ds = \int_0^t (4t - 3t^2) dt$$

$$\int_0^t (4t - 3t^2) dt$$

$$s = \left[\frac{4}{2} t^2 - \frac{3}{3} t^3 \right]_0^t$$

$$S = (2(4)^2 - 4^3 - (2(0)^2 - 0^2))$$

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

$$2.] \text{ F12-4}$$

$$v = (0.5t^3 - 8t)$$

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

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

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

$$t = 2,$$

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

$$a = \{1.5(2)^2 - 8\}$$

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

$$3.] \text{ F12-7}$$

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

$$S_0 = -2, S_2 = -20, S_4 = ?$$

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

$$\int v dt = S = \frac{4t^4}{12} - t^2 + C \cdot t + A$$

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

$$\text{at } S(0) = -2$$

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

$$A = -2$$

$$\text{at } S_2 = -20$$

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

$$C = -9.67$$

$$S_4 = \frac{t^4}{3} - t^2 - 9.67t - 2$$

$$\frac{4^4}{3} - 4^2 - 9 \cdot 67(4) - 2$$

$$S_4 = 28.65 \text{ m}$$

4) F12-8

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

$$a ds = v dv$$

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

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

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

$$a = (20 - 0.05(15)^2) \cdot -0.1 \times 15$$

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