

OKOPI DO UBONG ABASI WI

18 ENGO 3045

CIVIL ENGINEERING

1 FIG 12-3

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

$$s = \int v dt$$

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

When $t = 4$

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

$$= 32 - 64$$

$$= -32$$

2 FIG 12-4(a)

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

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

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

$$= 1.5t^2 - 8$$

$$a = \left. \frac{dv}{dt} \right|_{t=2}$$

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

$$6 - 8$$

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

3 FIG 12-7

$$A = (At^2 - 2) \text{ m/s}^2$$

$$v = \int A dt$$

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

$$s = \int v dt$$

$$= \int \left(\frac{At^3}{3} - 2t + C \right) dt$$

$$= \frac{At^4}{12} - \frac{2t^2}{2} + C$$

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

$$p = \frac{t^3}{3} - t^2 + Ct + K$$

When $t=0$, $p=2$

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

$$K = -2$$

When $t=2$, $p=-20$, $K=-2$

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

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

$$C = 9.7$$

$$p = \frac{1}{3}t^3 - t^2 - 9.7t - K$$

$$p = \frac{1}{3}(4)^3 - 4^2 - (9.7 \times 4) - 2$$
$$= 28.7$$

A For FIG 12-8

$$v = (20 - 0.5s^2) \text{ m/s}$$

$$dt = \frac{ds}{v} \text{ and } dt = \frac{dv}{a}$$

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

$$\frac{dv}{ds} = -0.18, \frac{ds}{dt} = (20 - 0.5s^2)$$

$$A = (60.18)(20 - 0.5s^2)$$

When $s=19$

$$A = (-0.1 \times 18)(20 - 0.5(18^2))$$
$$= -13.128 \text{ m/s}^2$$