

$$P = 28.7 \text{ m}$$

$$(4) V = (20 - 0.55s) \text{ m/s}$$

$$dt = \frac{ds}{v}, \quad dt = \frac{dv}{a}$$

$$a = \frac{dv}{dt}, \quad \frac{dv}{dt} = \frac{dv}{s} \times \frac{ds}{dt}$$

$$\frac{dv}{ds} = -0.55, \quad \frac{ds}{dt} = (20 - 0.55s^2)$$

$$A = (-0.55)(20 - 0.55s^2)$$

When $s = 15$

$$A = (0.1 \times 15) [20 - 0.05(15)^2]$$

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

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Mechatronics Engineering

Assignment

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

$$S = \int V dt$$

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

When $t = 4\text{s}$

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

$$= 32 - 64$$

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

$$2) \quad V = (0.5t^3 - 8t) \text{ m/s}$$

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

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

$$= 1.5t^2 - 8$$

$$A = \frac{dv}{dt} = 2$$

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

$$= 6 - 8$$

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

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

$$V = \int A dt$$

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

$$S = \int V dt$$

$$\int \frac{4t^3}{3} - 2t + C$$

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

$$P = \frac{1}{3}t^4 - t^2 + C + K$$

When $t = 0$ $P = 2$

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

$$K = -2$$

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

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

$$-20 = 0.7 + 2C$$

$$C = -9.7$$

$$P = \frac{1}{3}t^4 - t^2 - 9.7t - 2$$

When $t = 4$

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