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18/ENG041065 Electrical/Electronics Eng  
Mechanics IIFigure 12-3

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

$$s(t) = \int v(t) dt$$

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

$$s(t) = 2t^2 - t^3 + t_c$$

When  $t = 4\text{s}$ ;

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

$$= 32 - 64 + t_c$$

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

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

$$s(0) = 2(0)^2 - (0)^3$$

$$= 0 - 0$$

$$= 0\text{m}$$

Figure 12.4

~~$v =$~~

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

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

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

$$a(t) = v(t) \frac{d}{dt}$$

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

$$= \left( \frac{3}{2} t^2 - 8 \right)$$

$$a(t) = \left( \frac{3}{2} t^2 - 8 \right) \text{ m/s}^2$$

When  $t = 2 \text{ s}$ ;

$$\frac{3}{2} \times (2)^2 - 8$$

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

Figure 12-7

Date

No.

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

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

$$v(t) = \int a(t) dt$$

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

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

$$s(t) = \int v(t) dt$$

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

$$= \int \frac{4t^4}{12} - \frac{2t^2}{2} + ct + c$$

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

When  $t=2$

$$s(2) = \int \frac{2^4}{3} - 2^2 + 2c + c = -20$$

Date.

No.

$$c = \frac{-20 - 1.3}{3} = -7.1$$

at  $t = 4s$ 

$$s = \frac{4^4}{3} - 4^2 + (4 \times -7.1) + (-7.1)$$

$$s = 33.8 \text{ m}$$

Figure 12-8

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

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

$$a(s) = v(s) \frac{d}{dt}$$

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

$$= 20 - 0.105s^2$$

$$= 0.15$$

$$a(s) = -0.15$$

when  $s = 15 \text{ m}$

$$= -0.15 \text{ (15)}$$

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