Usman Mahmud Tahaya
181ENG04/1076
Electrical / Electronics

① $V = 4t - 3t^2$

$S = \int V dt$

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

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

~~$S = 0$~~

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

$c = 0$

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

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

$S = 32 - 64 + 0$

$S = -32$

$= 32m$ left of the x-axis

② $a = 4t^2 - 2$

$V = \int a dt$

$V = \frac{4t^3}{3} - \frac{2t}{1} + c$

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

$= \int v dt$

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

$S = \frac{t^4}{3} - t^2 + \frac{c^2}{2}$, $t = 2s$ $S = 20$

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

$\frac{56}{3} = \frac{c^2}{2}$

$C^2 = \frac{112}{3}$ $C = 6.11$

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

$S = \frac{t^4}{3} - t^2 + \frac{56}{3}$ $t = 4s$

$S = \frac{4^4}{3} - 4^2 + \frac{56}{3} = \frac{256}{3} - 16 + \frac{56}{3}$

$\frac{256 - 48 + 56}{3}$

$S = 88$

③ $V = (0.5t^3 - 8t)\,m/s$

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

$\therefore a = 1.5t^2 - 8$

where $t = 2s$

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

$a = 6 - 8 = -2\,m/s^2$

④ $V = (20 - 0.05s^2)\,m/s$

at $s = 15$

$V = 20 - 0.05(15)^2$

$V = 20 - (0.05 \times 225)$

$V = 20 - 11.25$

$V = 8.75\,m/s$

Using $v^2 = u^2 + 2as$

$8.75^2 = 0^2 + (2a \times 15$

$30a = 76.5625$

$a = \frac{76.5625}{30}$

$a = 2.55\,m/s^2$