⇒ Mechanics Assignement
⇒ ENG234
(1) For fig 12.3 (1)
$V = (4t - 3t^2)$ m/s
$s = \int v\,dt$
$s = \int (4t - 3t^2)\,dt$
$= 2t^2 - t^3$
when $t = 4$sec
$s = 2(4)^2 - (4)^3$
$= 32 - 64$
$s = -32$m

(2) For fig 12.4 (2)
$V = (0.5t^3 - 8t)$ m/s
$A = dv/dt$
$dv/dt = 3(0.5)t^2 - 8$
$= 1.5t^2 - 8$
$A = dv/dt|_{t=2}$
$= 1.5(2)^2 - 8$
$= 6 - 8 = -2$ m/s

(3) For fig 12.7 (3)
$A = (4t^2 - 2)$ m/s^2
$V = \int A\,dt$
$V = \int 4t^2 - 2$
$= 4t^2/3 - 2t + C$
$s = \int v\,dt$
$\int 4t^2/3 - 2t + C$
$= \frac{4t^3}{12} - \frac{2t^2}{2} + Ct$
$P = 1/3t^4 - t^2 + Ct + K$

When $t = 0$; $P = 2$
$-2 = 1/3(0)^4 - (0)^2 + C(0) + K$
$K = -2$

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When $t = 2$, $P = 20$, $K = -2$
$-20 = 1/3(2)^4 - 2^2 + C(2) - 2$
$-20 = -0.7 + 2C$
$C = -9.7$
$P = 1/3t^4 - t^2 - 9.7t - 2$
when $t = 4$
$P = 1/3(4)^4 - 4^2 - (9.7 \times 4) - 2$
$P = 28.7$m

4) For figure 12.8 (4)
$V = (20 - 0.5s)$ m/s
$dt = ds/V$
$dt = \frac{dv}{a}$
$a = \frac{dv}{dt}$; $\frac{dv}{dt} = \frac{dv}{ds} \cdot \frac{ds}{dt}$
$dv/ds = -0.1$sec ; $\frac{ds}{dt} = (20 - 0.5s^2)$
$A = (-0.1s)(20 - 0.05s^2)$
when $s = 15$
$A = (-0.1 \times 15)(20 - 0.05(15)^2)$
$A = -13.125$ m/s^2

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