Now clearly $V(t) = 100 + (4-2)t$ litres.

$= 100 + 2t \qquad 0 \le t \le 25$ 1

Also the tank is full at time $t = 25$

since $V = 100 + 2(25) = 150L$.

Now $\frac{dA}{dt}$ = rate in − rate out $= 8 - \frac{2A}{100+2t}$, $t \le 25$ 2

i.e. $\boxed{\frac{dA}{dt} + \frac{2A}{100+2t} = 8}$ with $A(0) = 200Kg$. 1

$P = \frac{2}{100+2t} \Rightarrow \mu = e^{\int \frac{2}{100+2t}\,dt} = e^{\ln(100+2t)}$ 2

$\Rightarrow \mu = 100 + 2t$ is the I.F. 1

$\therefore \frac{d}{dt}\{(100+2t)A\} = 8(100+2t)$ 1

Integrating yields $(100+2t)A = 8(100t + t^2) + C$ 1

i.e. $A = \frac{8t(100+t)+C}{100+2t}$ 1

$A(0) = \frac{C}{100} = 20 \Rightarrow C = 2\times10^3$ 1

Soln of I.V.P $\boxed{A = \frac{8t(100+t)+2\times10^3}{100+2t}}$ 1

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