December
TUESDAY
26
360-005 • WK 52
2017

PH3105.
PS-2

AMIT PRATAP
18MS175.

1) (a) $\frac{dy}{dt} = -1000y + 3000 - 2000e^{-t}$.

$\Rightarrow \frac{dy}{dt} + 1000y = 3000 - 2000e^{-t}$.

$\Rightarrow$ I.F $= e^{\int 1000\,dt}$.

$= e^{1000t}$

$y e^{1000t} = \int (3000 - 2000e^{-t}) e^{1000t}\,dt$.

$\Rightarrow y e^{1000t} = \int (3000e^{1000t} - 2000e^{999t})\,dt$.

$\Rightarrow y e^{1000t} = \frac{3000}{1000} e^{1000t} - \frac{2000}{999} e^{999t} + C$.

$\Rightarrow 0 = 3 - \frac{2000}{999} + C$.

$\Rightarrow C = \frac{2000}{999} - 3$.

$\Rightarrow C = -0.99799$

$y(t) = -0.99799e^{-1000t} - 2.002e^{-t} + 3$.