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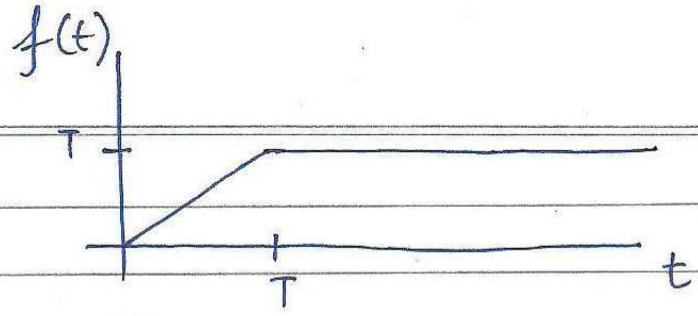
Q2.



$$\therefore \quad F(s) = \int_0^T t\, e^{-st}\, dt + \int_0^\infty T\, 1(t-T)\, e^{-st}\, dt$$

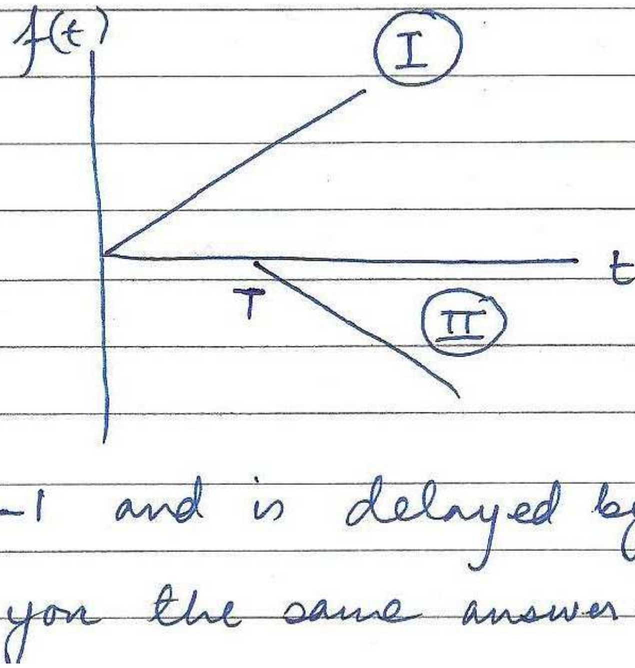
$\longrightarrow$ Because the step height is T.

and, $1(t-T) \longrightarrow$ unit-step function that occurs at $t = T$

$$\therefore \quad F(s) = \left[t\,\frac{e^{-st}}{-s} \right]_0^T - \int_0^T \frac{e^{-st}}{-s}\, dt + T\,\frac{e^{-sT}}{s}$$

$$= -T\frac{e^{-sT}}{s} - \left[\frac{e^{-sT}}{s^2} - \frac{1}{s^2} \right] + T\,\frac{e^{-sT}}{s}$$

$$= \frac{1 - e^{-sT}}{s^2}$$



Alternatively, you can consider the function as a combination of two ramps, I and II. The slope of the second ramp II is -1 and is delayed by T. This approach should give you the same answer.