Quiz - 2

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② $\mathcal{L}^{-1}\left\{\frac{3s+8}{s^2+2s+5}\right\}$

s^2+2s+5

$\Rightarrow s^2+2.s.1+1+2^2$

$\Rightarrow (s+1)^2+2^2$

$\Rightarrow \mathcal{L}^{-1}\left\{\frac{3s+8}{(s+1)^2+2^2}\right\}$

$\Rightarrow \mathcal{L}^{-1}\left\{\frac{3(s+1)+5}{(s+1)^2+2^2}\right\}$

$\Rightarrow 3\mathcal{L}^{-1}\left\{\frac{(s+1)}{(s+1)^2+2^2}\right\}+\frac{5}{2}\mathcal{L}^{-1}\left\{\frac{2}{(s+1)^2+2^2}\right\}$

$\Rightarrow$ ~~$3\sin(2t).e^{-t}+$~~

$\Rightarrow 3e^{-t}.\cos(2t)+\frac{5}{2}e^{-t}.\sin(2t)$

$\Rightarrow e^{-t}\left(3\cos(2t)+\frac{5}{2}\sin(2t)\right)$

Ans

K = 8

① $\mathcal{L}\{t^2 e^{(k+1)t} \cdot t\}$

$= \mathcal{L}\{t^2 \cdot e^{9t} \cdot t\}$

$= (-1)^2 \left(\frac{d}{ds}\right)^2 \mathcal{L}\{e^{9t} \cdot t\}$

$= (-1)^2 \cdot \left(\frac{d}{ds}\right)^2 \left[\frac{1}{(s-9)^2}\right]$

$\Rightarrow \frac{d}{ds} \cdot \frac{d}{ds}\left((s-9)^{-2}\right)$

$\Rightarrow \frac{d}{ds}\left[-2(s-9)^{-3} \cdot 1\right]$

$\Rightarrow (-2)(-3) \cdot (s-2)^{-4} \cdot 1$

$\Rightarrow \frac{6}{(s-2)^4}$ Ans)