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① $\int_{-3}^{\infty} (t+1)\, \delta t \, dt$

Sol^n:- We know,

$$\delta(t) = \begin{cases} 1, & t=0 \\ 0, & \text{elsewhere} \end{cases}$$

$$\therefore \int_{-3}^{\infty} (t+1)\, \delta t \, dt = [t+1]_{t=0}$$

$$= 1$$

② $\int_{-3}^{-5} (t^2+1)\, \delta(t)\, dt$

Sol^n:- We know,

$$\delta(t) = \begin{cases} 1, & t=0 \\ 0, & \text{elsewhere} \end{cases}$$

$$\therefore \int_{-3}^{-5} (t^2+1)\, \delta(t)\, dt$$

$$= 0 \quad [\because \delta(t) = 0 \text{ for all } t \neq 0]$$

③ $\int_{-\infty}^{-3} e^{-at} u(t)\, dt$

Sol^n:- We know,

$$u(t) = \begin{cases} 1, & t \geq 0 \\ 0, & t < 0 \end{cases}$$

$$\therefore \int_{-\infty}^{3} e^{-at} \cdot u(t)\, dt = 0$$

④ $\int_{-\infty}^{\infty} e^{(2-t)}\, \delta(t-2)\, dt$

Sol^n:- We know,

$$\delta(t-2) = \begin{cases} 1, & t=2 \\ 0, & \text{elsewhere} \end{cases}$$

$$\therefore \int_{-\infty}^{\infty} e^{(2-t)} \cdot \delta(t-2)\, dt = [e^{2-t}]_{t=2}$$

$$= e^0$$

$$= 1$$