



(An Autonomous Institution)

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4)
$$L(t^n) = \frac{2!}{s^3}$$

5) $L(t^n) = \frac{1}{s^{n+1}}$ if s70 and n7-1.

$$L(t^n) = \int_0^\infty e^{-st} \cdot t^n dt$$
Put $x = St$, $dx = Sdt$

$$dx = dt$$

$$L(t^n) = \int_0^\infty e^{-2t} \cdot \frac{x^n}{s^{n+1}} dx$$

$$= \int_0^\infty e^{-2t} \cdot \frac{x^n}{s^{n+1}} dx$$

$$= \frac{1}{s^{n+1}} \int_0^\infty e^{-2t} x^n dx$$

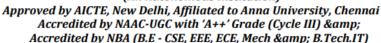
$$L(t^n) = \frac{1}{s^{n+1}} = \frac{n!}{s^{n+1}}$$
6) $L(e^{at}) = \int_0^\infty e^{-st} e^{-st} dt$

$$L(e^{at}) = \int_0^\infty e^{-(s-a)t} dt$$

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$$L(e^{at}) = \frac{1}{s-a} \quad \text{if } s-a > 0.$$

$$I(e^{-at}) = \frac{1}{s+a} \quad \text{if } s+a > 0.$$

$$L(e^{-at}) = \int_{0}^{\infty} e^{-st} e^{-at} dt$$

$$= \int_{0}^{\infty} e^{-(s+a)t} dt$$

$$L(e^{-at}) = \int_{0}^{\infty} e^{-(s+a)t} dt$$

$$= \int_{0}^{\infty} e^{-(s+a)$$





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Problems:

$$L(sinhat) = L \left(\frac{e^{at} \cdot e^{at}}{2}\right)$$

$$= \frac{1}{2} L(e^{at}) - \frac{1}{2} L(e^{at})$$

$$= \frac{1}{2} \left(\frac{1}{5 \cdot a} \cdot \frac{1}{5 \cdot at}\right)$$

$$= \frac{1}{2} \left(\frac{2a}{5 \cdot at}\right)$$

$$L(sinhat) = \frac{a}{5 \cdot a^2} \quad \text{for } s > a^2$$

$$L(coshat) = L \left(\frac{1}{2} \left(e^{at} + e^{at}\right)\right)$$

$$= \frac{1}{2} L(e^{at}) + \frac{1}{2} L(e^{at})$$

$$= \frac{1}{2} \left(\frac{1}{5 \cdot a} + \frac{1}{5 \cdot at}\right)$$

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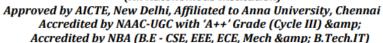
$$= \frac{1}{2} \left(\frac{1}{5 \cdot at} + \frac{1}{5 \cdot at}\right)$$

$$= \frac{1}{2} \left(\frac{1}{5 \cdot at} + \frac{1}{5 \cdot at}\right)$$

$$= \frac{1}{2} \left(\frac{1}{5 \cdot at}\right)$$

$$=$$







2) Find
$$L(t+1)^{2}$$
:

$$del: L(t+1)^{2} = L(t^{3}+2t+1)$$

$$= L(t^{2})+2L(t)+L(1)$$

$$= \frac{2!}{s^{3}} + \frac{2}{s^{2}} + \frac{1}{s}$$

3) Find $L(\frac{1}{Jt})$.

$$del: L(\frac{1}{Jt}) = L(t^{-\frac{1}{2}})$$

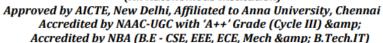
$$= \frac{(-\frac{1}{2}+1)}{s^{-\frac{1}{2}+1}} = \frac{\sqrt{12}}{s^{-\frac{1}{2}}} = \frac{\sqrt{12}}{s}$$

$$= \frac{\sqrt{12}+1}{s^{-\frac{1}{2}+1}} = \frac{1}{2} \frac{\sqrt{12}}{s} = \frac{1}{2} \frac{\sqrt{12}}{s^{-\frac{1}{2}}}$$

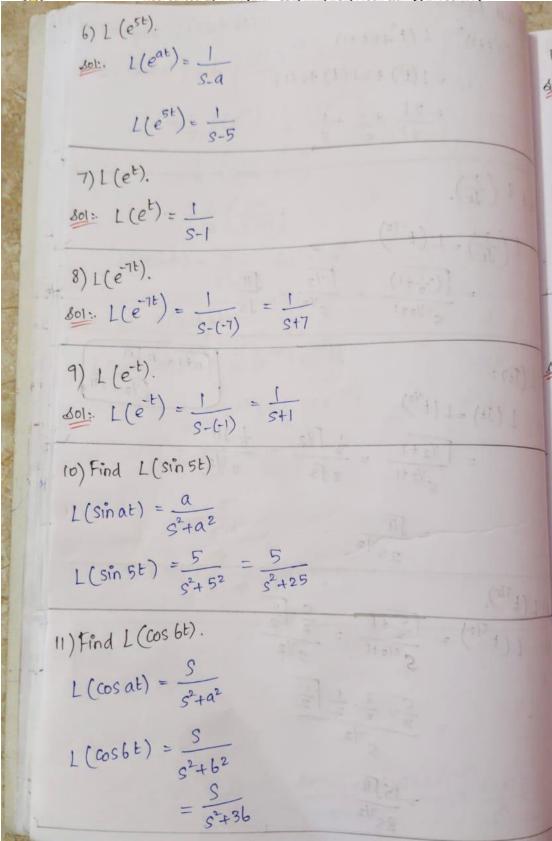
$$= \frac{\sqrt{12}+1}{2s^{-\frac{1}{2}+1}} = \frac{\frac{1}{2} \sqrt{12}}{s^{-\frac{1}{2}}} = \frac{\frac{1}{2} \sqrt{12}}{s^{-\frac{1}{2}}}$$

$$= \frac{\sqrt{12}+1}{2s^{-\frac{1}{2}+1}} = \frac{\frac{1}{2} \sqrt{12}}{s^{-\frac{1}{2}}} = \frac{1}{2} \sqrt{\frac{12}{2}}$$

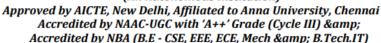














12) Find
$$L(\sin^2 2t)$$
.

dol: $Sin^2 2t = \frac{1 - \cos 2t}{2}$

$$L(\sin^2 2t) = L(\frac{1 - \cos 2(2t)}{2})$$

$$= \frac{1}{2}L(1 - \cos 4t)$$

$$= \frac{1}{2}\left[L(1) - L(\cos 4t)\right]$$

$$= \frac{1}{2}\left[\frac{1}{3} - \frac{S}{s^2 + 1b}\right]$$

13) Find $L(\cos^2 3t)$.

(cos² 2t) = $L(\frac{1 + \cos 2t}{2})$

$$= \frac{1}{2}L(1 + \cos 6t)$$

$$= \frac{1}{2}L(1 + \cos 6t)$$

$$= \frac{1}{2}\left[L(1) + L(\cos 6t)\right]$$

$$= \frac{1}{2}\left[\frac{1}{3} + \frac{S}{s^2 + 3b}\right]$$

14) Find $L(\cos^3 2t)$.

(dol: $\cos^3 2t$) = $L(\cos^3 2t) + 3\cos^2 2t$

$$= \frac{1}{4}\left[L(\cos 6t) + 3L(\cos 2t)\right]$$

$$= \frac{1}{4}\left[\frac{S}{s^2 + 3b} + \frac{3}{3}\frac{S}{s^2 + 4}\right]$$

$$= \frac{1}{4}\left[\frac{S}{s^2 + 3b} + \frac{3}{3}\frac{S}{s^2 + 4}\right]$$





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