

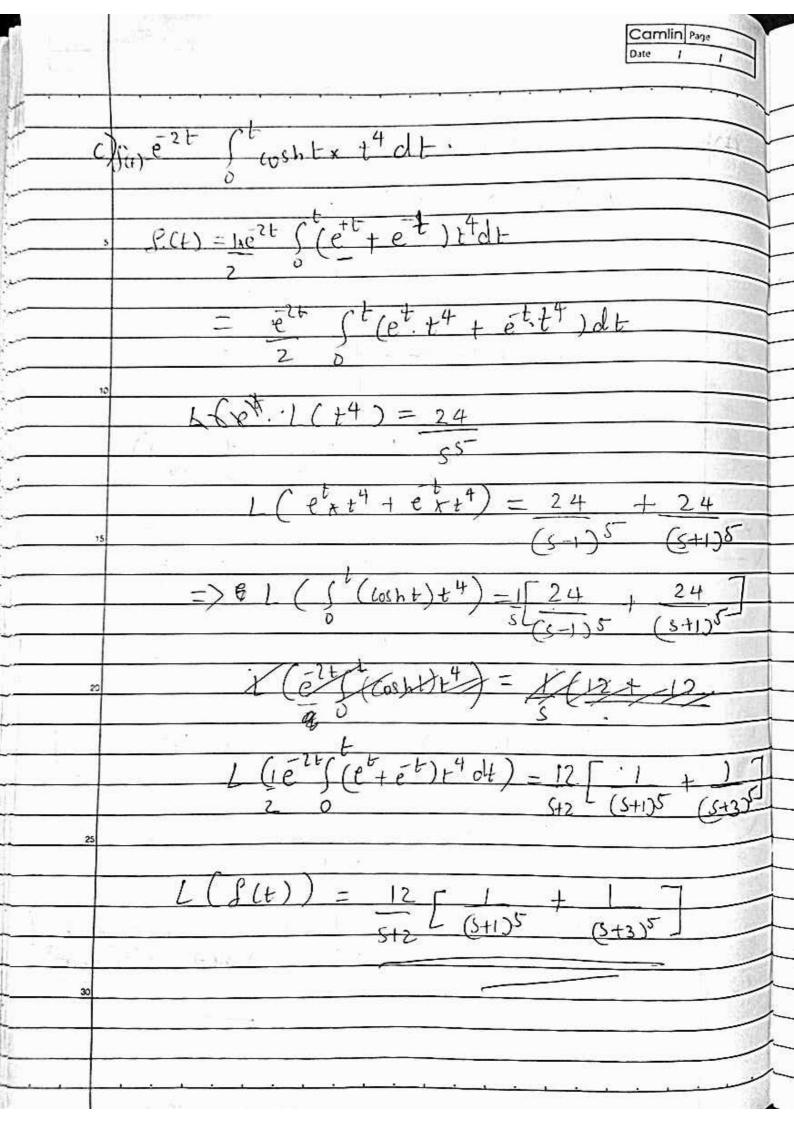
 $L\left(\frac{e^{3t}}{e^{3t}}, t, (\alpha^{2})^{2}\right) = \frac{1}{2}\left[\frac{1}{(s+3)^{2}} + \frac{(s+3)^{2}-16}{(s+3)^{2}+16}\right]^{2}$ 

1+ cos4L

(b) for Ct = 3t t cos22+ dt.

 $= \frac{1}{2} \left[ \frac{1}{s^2 + 6s + 9} + \frac{s^2 + 6s - 7}{\left(s^2 + 6s + 25\right)^2} \right]$ 

 $\frac{1}{2}\left(\int_{0}^{t-3} t_{1} + \cos^{2} 2t\right) = \frac{1}{2} * \left[\frac{1}{5^{2}+65+7} + \frac{5^{2}+65-7}{5^{2}+65+75}\right]^{2}$ 



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$$\frac{(d)\left(\frac{\sin 2t}{\sqrt{2t}}\right)^2 - \frac{\sin^2 2t}{2t} = g(t)}{2t}$$

$$\frac{1}{2} = \frac{1}{5} \left( \frac{1 - 5}{5^2 + 16} \right)$$

$$\frac{1}{5} \left( \frac{\sin^2 2t}{5} \right) = \frac{1}{5} \left( \frac{\cos 4}{5} \right) = \frac{5}{5}$$

$$\frac{1-\left(\frac{\sin^{2}2t}{2t}\right)-\frac{1}{4}\int_{s}^{\infty}\frac{1-\frac{s}{5}}{\frac{1}{5}+16}$$

$$= \frac{1}{4} \left[ \log s - \frac{1}{2} \log (s^2 + 16) \right]$$

$$= \frac{1}{4} \left[ \log \frac{s}{s} \right]^{\infty}$$

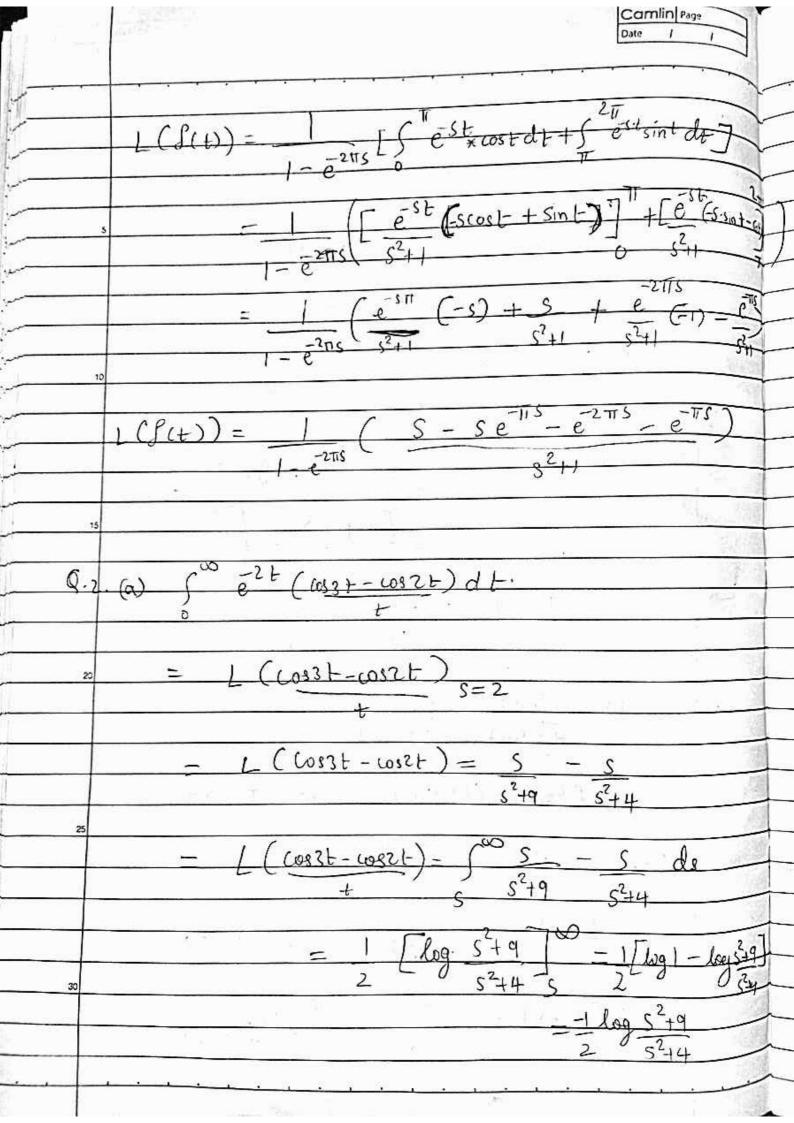
$$\frac{1}{2}(s(t)) = -1 \log s$$

(e) 
$$f(t) = e^{t} \cos t + e[\theta, \pi]$$
  
 $e^{t} \sin t + e[\pi, 2\pi]$ 

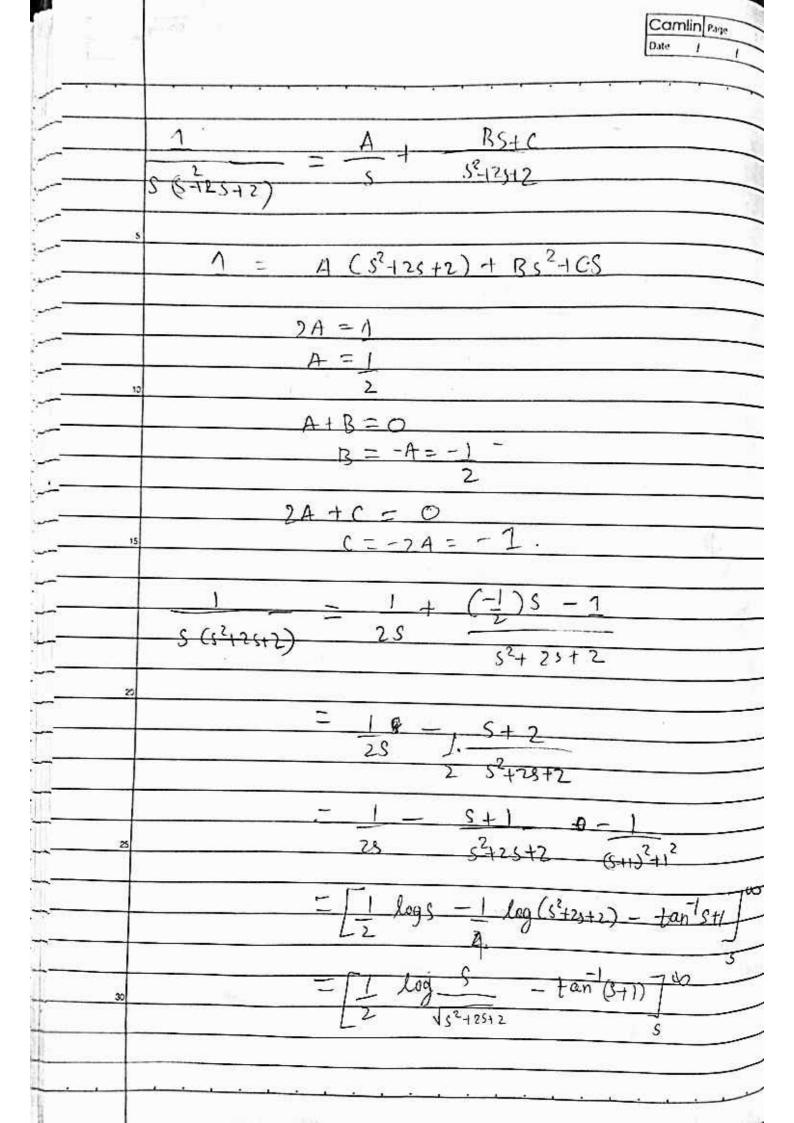
$$f(t) = f(t+2\pi)$$
 Here  $T = 2\pi$ 

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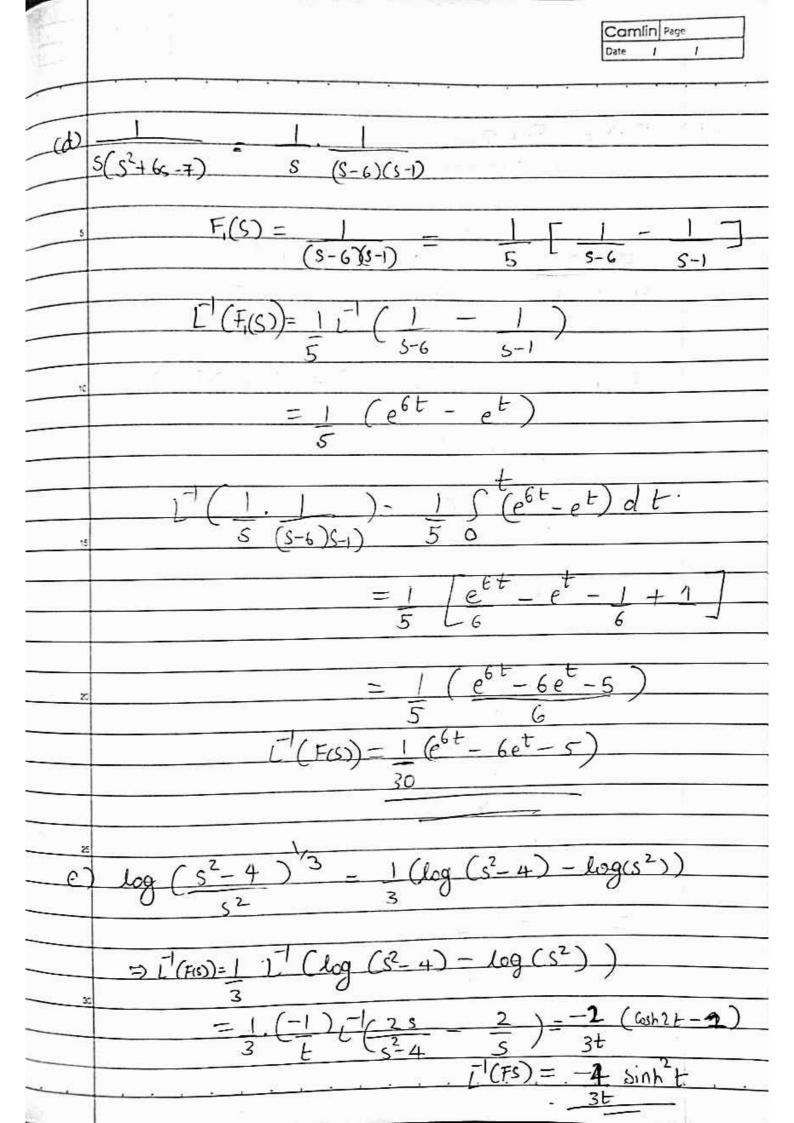
$$L(f(t)) = \frac{1}{1 - e^{-2tt}s} \int_{s}^{2tt} \frac{-st}{e} f(t) dt.$$



Camlin Page = 1 lug 52+4 2 S2-19  $Ans = \frac{1}{2} \log \frac{8}{13}$ b)  $\int_{-\infty}^{\infty} e^{-t/2} (\frac{1}{t} \int_{-\infty}^{t} e^{-u} \sin u du) dt$ let f(t) = 1 steusinudu :. Set2.S(+) dt. = L(S(t)) => s = t1L (sinu) = 1 1 ( e sinu) = 1  $L\left(\int_{0}^{t-u} \sin u dy = \frac{1}{s} \frac{1}{(s+1)^{2}+1}$  $L\left(\frac{1}{5} \int_{e}^{t-u} \sin u \, du\right) = \int_{s}^{\infty} \int_{s}^{\infty$ 



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	$= -\frac{1}{2} \log \frac{s}{\sqrt{s^2 + 2s + 2}} - \frac{11}{2} + \frac{1}{2} an \frac{s+1}{2}$
5	Now put $s=+1$ Any - +1 log $\sqrt{13}$ - $\sqrt{17}$ + $\sqrt{2}$
10	= 1 log 13 - II + tan 13 4 2 2
Q.: (a) F	
Z	
z	一声上一
3	$\frac{1}{1}\left(e^{-35}F_{r}(s)\right) = e^{-(t-3)}\cos(t-3)u(t-3)$ $\frac{-(t-3)}{1}\left(F(s)\right) = e^{-(t-3)}\cos(t-3)u(t-3)$



$$(f) F(s) = 5s + 2$$

$$(9+1)(s^2-2s+5)$$

$$\frac{5s+2}{(s+1)(s^2-2s+5)} = \frac{A}{5+1} + \frac{Bs+C}{5^2-2s+5}$$

$$5s+z = A(s^2-2s+5) + (Bs+F)(S+1)$$

$$A = -\frac{3}{8}$$

$$2 = 5A + C$$

$$7 = \frac{-3}{2} + 2(B+31)$$

$$F(S) = -\frac{1}{5} + \frac{1}{8} \frac{3s + 31}{5^2 \cdot 2s + 5}$$

$$\frac{1}{5} + \frac{1}{8} \frac{3(s + 1)}{5^2 \cdot 2s + 5}$$

$$\frac{1}{5} + \frac{1}{8} \frac{3(s - 1)}{5^2 \cdot 2s + 5} + \frac{34}{5^2 \cdot 2s + 5}$$

$$\frac{1}{5} + \frac{1}{8} \frac{3(s - 1)}{5^2 + 1} + \frac{34}{12} \frac{3(s - 1)}{5^2 + 1} + \frac{11}{12} \cdot \frac{2}{12} \frac{1}{5^2 + 1}$$

$$= -e^{-\frac{1}{5}} + \frac{1}{12} \frac{3e^{-\frac{1}{5}}}{3e^{-\frac{1}{5}}} + \frac{17}{12} \frac{e^{-\frac{1}{5}}}{3e^{-\frac{1}{5}}} + \frac{17}{12} \frac{e^{-\frac{1}{5}}}{3e^{-\frac{1}{5}}}$$

$$= -e^{-\frac{1}{5}} + \frac{1}{12} \frac{3e^{-\frac{1}{5}}}{3e^{-\frac{1}{5}}} + \frac{17}{12} \frac{e^{-\frac{1}{5}}}{3e^{-\frac{1}{5}}} + \frac{17}{12}$$

$$y'' + 2y' + y = 3te^{\frac{t}{t}}, y(0) = 0, y'(0) = 2$$

Taking Iaplace on both sides

$$L(y'') + 2L(y') + L(y) = 3L(te^{\frac{t}{t}})$$

$$S^{2}y(s) - Sy(0) - y'(0) + 2(SY(S) - y(0))$$

$$+ Y(S) = 3 * 1$$

$$(1+S)^{2}$$

$$Y(S)(S^{2} + 2S + 1) - 2 = 3$$

$$(S+1)^{2}$$

$$Y(S) = 3 + 2$$

$$Y(S) =$$