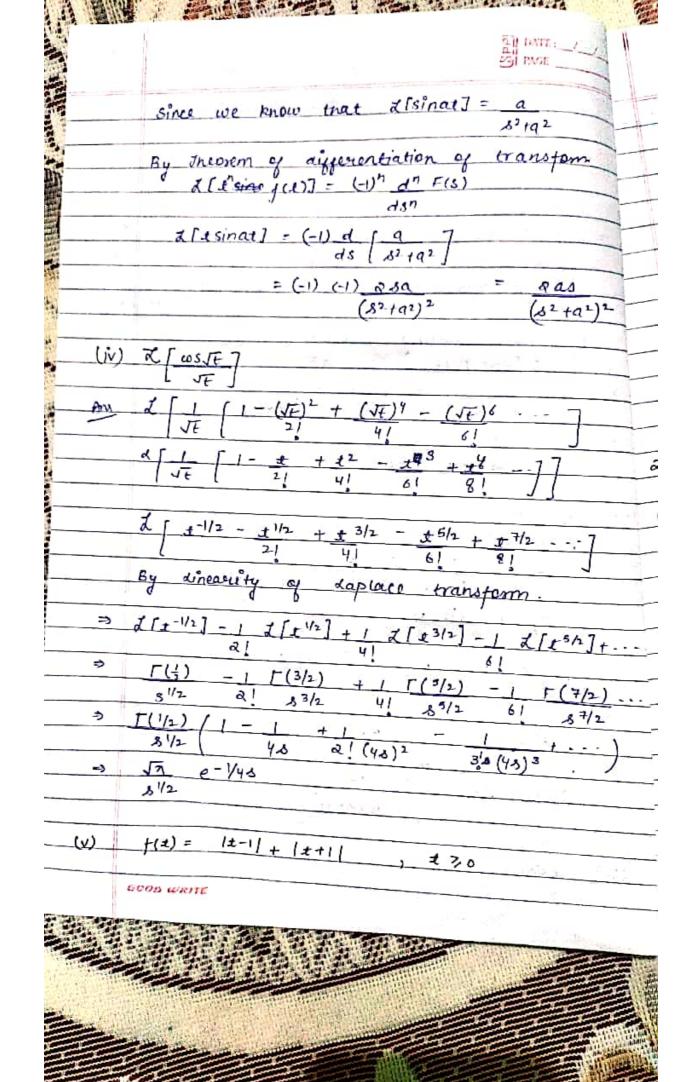
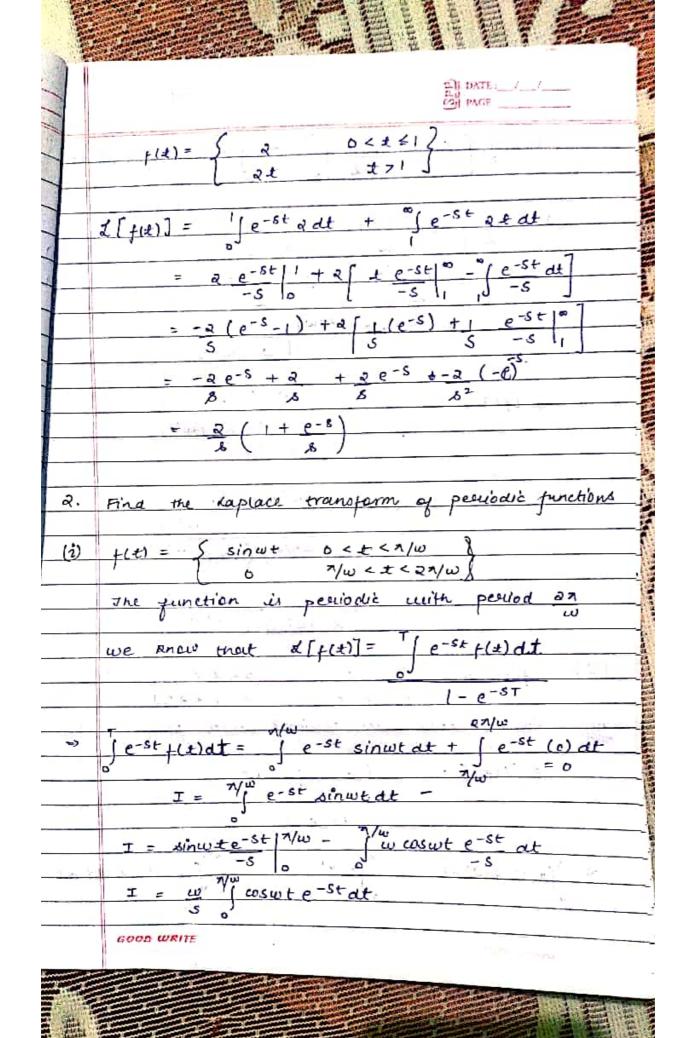
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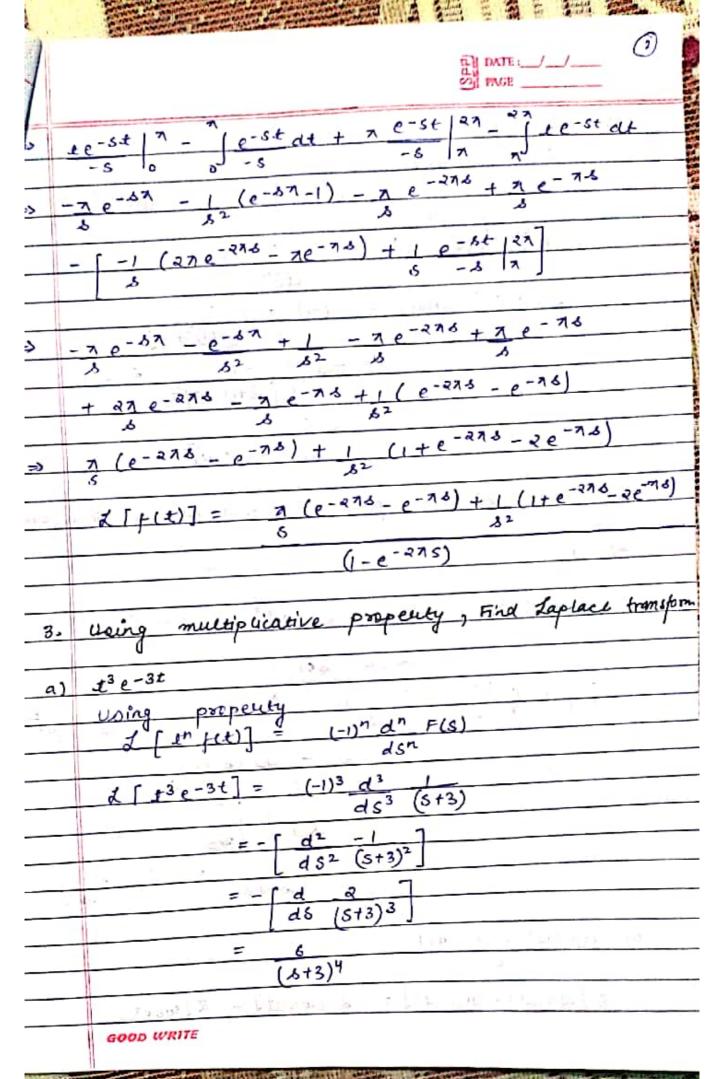
. All 1	esy mes
	Assignment - 4
- 1 <u>8</u>	Find the Laplace transform.
a)	e-3t (2055t - 35105t)
Anı	= L[e-3+ (20055t - 3sinst)]
	= a I[e-3+ Losst] - 3 Z[e-3+ sinst]
3	Since $\chi$ [cost] = $\beta$ and $\chi$ [sinst] = $\beta$ $\beta^2 + 25$ $\delta^2 + 25$
*)	By First snifting theorem! -
=>	Z[eat f(i)] = F(s-a)
÷	$2 \left[ \frac{3+3}{(49+25)} \right] - 3 \left[ \frac{5}{(5+3)^2} + 25 \right]$
7	28+6-15 = 28-9
	82+9+25+63 82+63+34
(ii)	JE e3t
Any	d[√103t]
	2[JE] = "je-st JE at
	$st = p \Rightarrow at = ap$
	$= \frac{\infty}{6} \left( \frac{e^{-P} \left( \frac{\rho}{5} \right)^{1/2} d\rho}{5} \right) = \frac{8}{5}$
	=10 e-P p1/2 dp [Gamma Function]
	= 1 /3/2 = - \bar{7}
	83/2 2 23/2
	By First shifting theorem
	7 (03t JE] 52
	R (15-3)3/2
(iii)	1 sin (at)
	Is t sinut]
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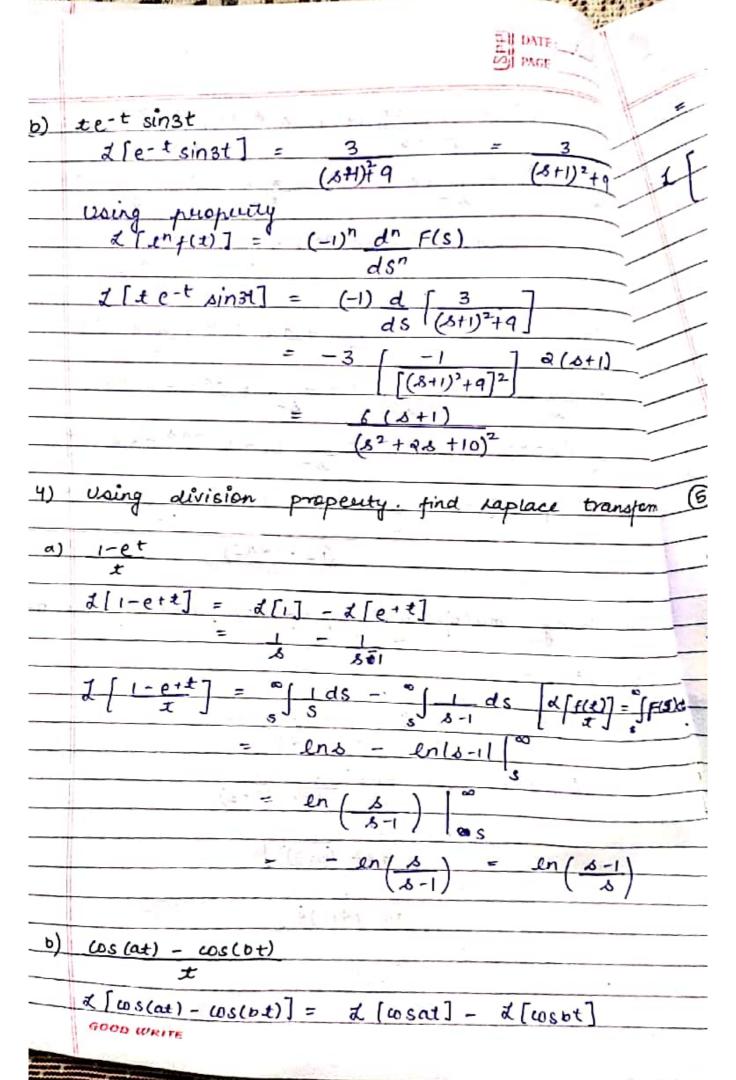


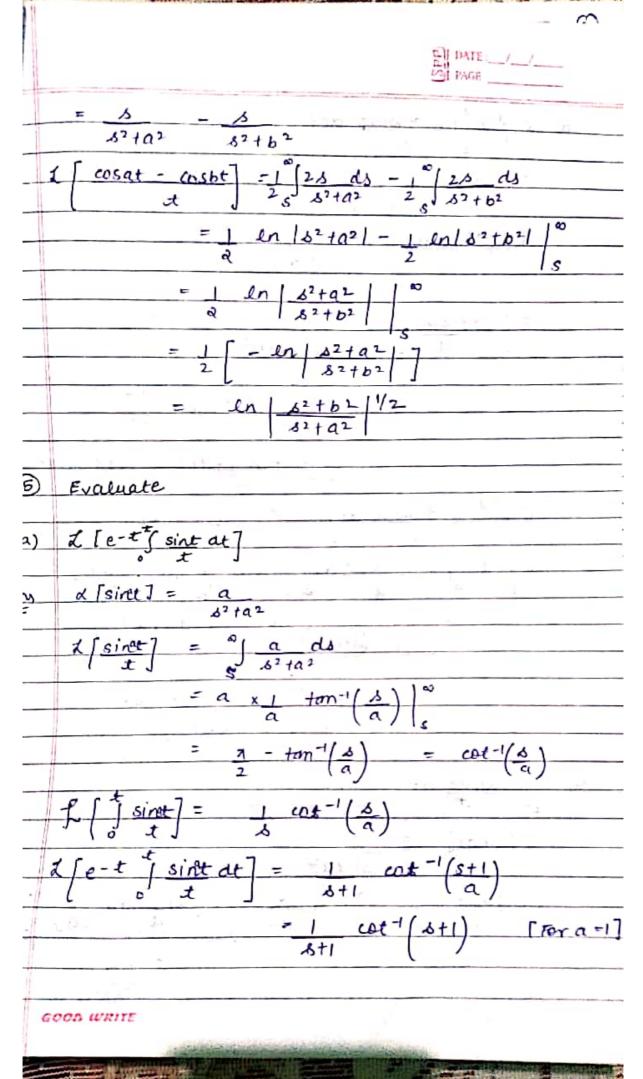


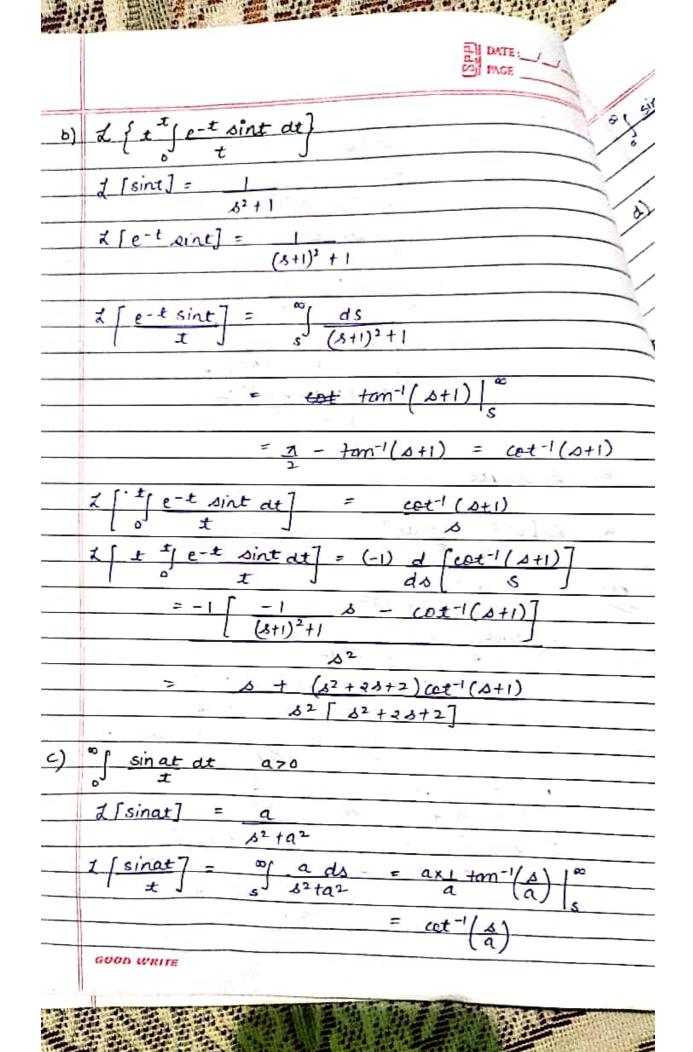


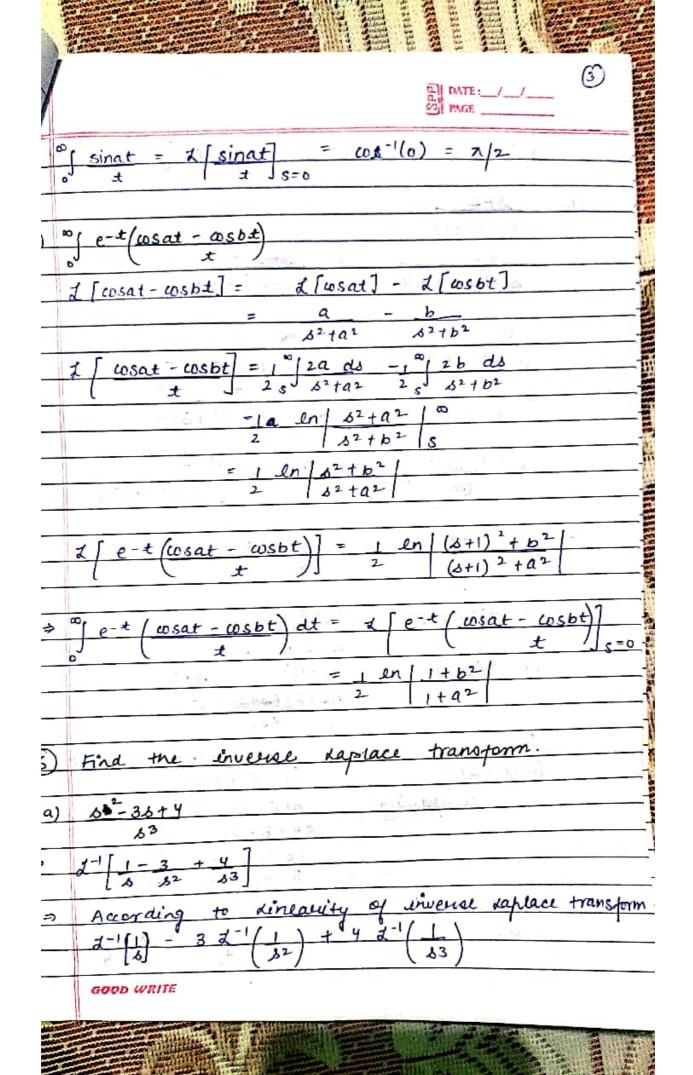
7 - w [ cos we e-m | \*/w - | \*/w - | \*/w - state 22. 2 [ -2.1/10 +1 - 10 ]  $I\left(\frac{3^{3} \cdot 1 \cdot w^{2}}{3 \cdot w}\right) = \frac{e^{-57/w} \cdot 11}{3}$   $I = \left(1 + e^{-37/w}\right) \left[\frac{w}{4^{3} \cdot 1 \cdot w^{2}}\right]$ 1-(e-1/w)2 (1+e-27/w) 1 [4(2)] (1-0-27/0) (1+0-27/0) 12+w2)(-p-22/w+1) perciodic with perciod T | e-s+ f(1) d+ 1- e-ST = 1e-st tat + (p-st (n-t) dt > Te-st f(t)at GOOD WRITE

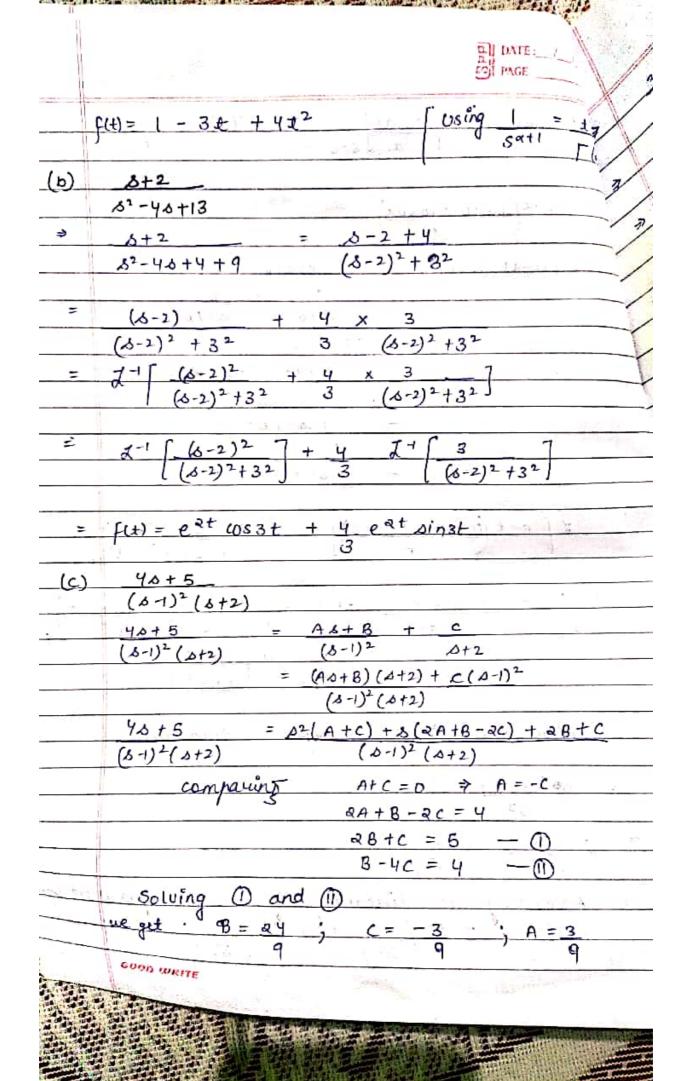


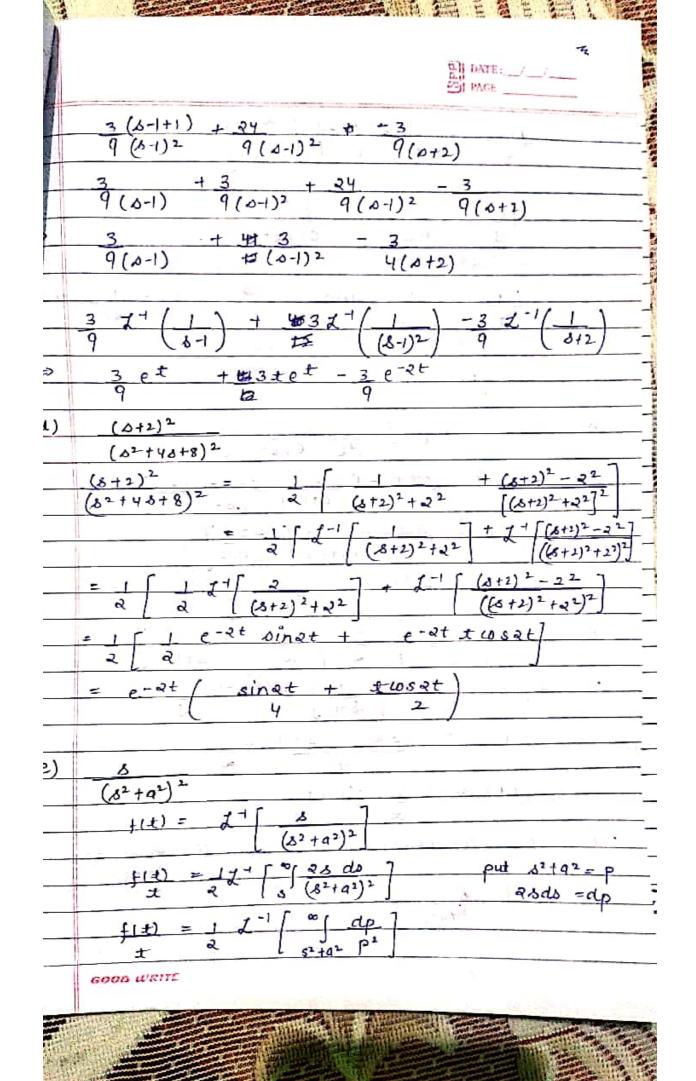


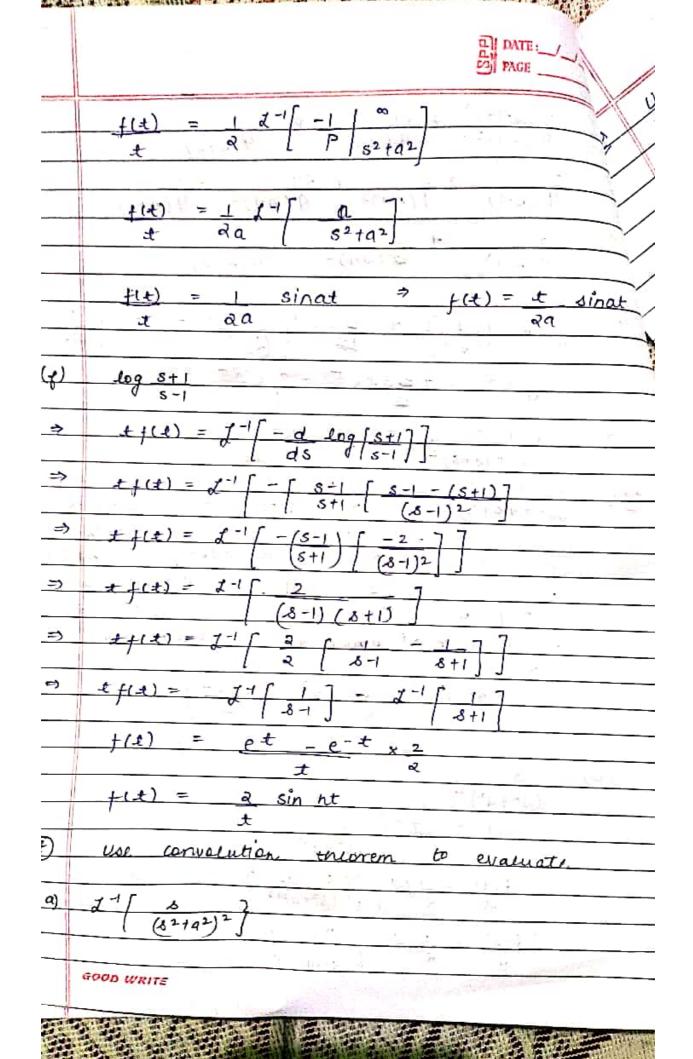












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1	DATE:_/ PMGE
şt	Using convolution theorem $ \frac{1}{1} \left[ F(s) G(s) \right] = \int_{0}^{t} f(t) g(t-t) dt $
	$- \int S = \frac{1}{2} \int \frac{\sin(t-t) \cos(t-t)}{\cos(t-t)} \cos(t-t) dt$
⇒ ¬	Stat Stat   Sinat (nsat - cosatsinal) cosat dt   Sinat (nsat dt - cosat) sinal (nsat dt)
=>	1 ( sinat t (1+ cosacz) dz - cosat sin2at ]
0	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
2)	t sinat
b)	$\frac{z^{-1} \left[ (\delta^2 + 1) (\delta^2 + 9) \right]}{\int_{-1}^{-1} \left[ F(S) G(S) \right]} = \int_{-1}^{2} f(T_s) g(t-T) dT$
Aru =>	$\frac{1^{-1} \int_{-1}^{1} \frac{1}{8^2+1} \frac{1}{8^2+9} \frac{1}{9} \frac{1}{9} \frac{\sin(z-z)}{3} dz$
<i>v</i> .	1 [sin3t] sint cos3T dt - cos3t sintsin3T dt  1 [sin3t] sint cos3T dt - cos3t sint sint sin3T dt]
⇒	1   sin3 +   [sin4z + sin(-2z)] dz - (053 +   sin4 - (054z) d]
, , , , , , , , , , , , , , , , , , , ,	GOOD WRITE

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DATE: / /
       sin3t / - 654++ - 1 (-652++1) -653t / 6inat -
       sin3t [ - cosyt+1 + cosat -1 - cos3t [ sinat -
8. Use daplace transform method to solve the proble
    \frac{d^{2}x - 2dx + x = e^{+}}{dt^{2}}, x(0) = 2 x'(0) = -1
            dt
         Jaking
                daplace transform both sides
    Z[z"(+)]
               2 1[2'(+)] + 1[2(+)] = 1[e1]
           Z[Z(±)] = X(s)
\Rightarrow \int [2''(H)] = s^2 X(s) - s Z(0) - Z'(0)
                                                     3
                62 X(S) - 28 +1
    I [2'(t)] = SX(S) = x(0)
                                                     3
                  5 X(8) - 2. -
    52 X(s) - 25 +1 - 25 X(s) +4 + X(s) = 1
    X(s) [82-28+1] = 1 + 28 - 5
=>
    X(s) (s-1)2
                         1+(23(-5)(8-1)
                            (1-8-1)
      X(s) =
⇒
                 1+ 232-23-53+5
                        (8-1)3
      X(s) =
                   282 - 78 +6
                    (8-1)3
    X(3) =
               2[52-28+1] -3(5-1)
                   (8-1)3
                                (6-1)3
                                           (8-1)3-
   X(s) =
                     (8-1) 2
```

```
+ 2d2y
                          - ay = 0 [ y(2) = 0, y'(0) = 0, y'(0) = ]
   d 23
             d72
bi
           Jaking daplace transform bys
   1[2"(1)] + 22[2"(1)] - 2[2'(1)] - 21[2(1)]=1[0]
   \chi[\chi'''(t)] = 5^3 \chi(s) - 5^2(0) - 5(0) - 5
               = s^3 X(s) - 6
   d \left[ 2''(t) \right] = S^2 \chi(s) - S(0) - (0)
                = s^2 X(s)
    2 [x'(t)] = SX(s) -0
1 53 X(s) - 6 + 252 X(s) - 5 X(s) - 2 X(s) = 0 [I[0]=0
  X(s) [ 3+252-3-2]= 6
  X(s) \left[ s^{2}(s+2) - 1(s+2) \right] = 6
   X(s) (b+2) (b<sup>2</sup>-1) = 6
   X(s) =
=>
                   (s+2) (s+1) (s-1)
                               В
     x (s)
                               A+1
                    8+2
                     A(32-1) + B(32+6-2) + C(32+36+2)
                       (B+2) (B+1) (B-1)
                         solving
   A+B+C=0
     B + 3C = 0
    - A - 28+2C= 6
      X CS) =
                   8+2
                  Qe-2x - 3e-x + ex
```

