Date: 03-05-2018   Dept. No.   Max. : 100 Marks
Time: 09:00-12:00

Part – A

Answer ALL the questions :   **(10x2=20)**

1) Find L [$e^{-3t} \cos 2t$].

2) Find L [$t \cos 5t$].

3) Find $L^{-1}\left[\frac{1}{(s-a)^2}\right]$.

4) Find $L^{-1}\left[\frac{1}{(s+2)^2+16}\right]$.

5) Prove that $F[f(ax)] = \frac{1}{|a|} F\left(\frac{s}{a}\right)$.

6) Write the Complex forms of Fourier integral.

7) Define Fourier Cosine transform.

8) Find $F_c(e^{-ax})$.

9) Solve : $\frac{\partial^2 z}{\partial x \partial y} = x^2 + y^2$.

10) Solve : p + q = x + y.

Part – B

Answer any FIVE questions :   **(5x8=40)**

11) Evaluate : $L\left[\frac{\cos 3t - \cos 2t}{t}\right]$.

12) Find the Laplace transform of $f(t) = \begin{cases} e^{2t} & 0 < t < 3 \\ 1 & t > 3 \end{cases}$

13) Find $L^{-1}\left[\frac{s-3}{s^2+4s+13}\right]$.

14) State and prove Convolution theorem.

15) Show that $F(x^n f(x)) = (-i)^n \frac{d^n}{ds^n} F[f(x)]$.

16) State and prove Parsival's identity.

17) Solve $p(1+q)^2 = q(z-1)$.

18) Solve pxy + pq + qy = yz by Charpit's method.

Part –C

Answer any TWO questions :   **(2x20=40)**

19) a) Evaluate $\int_0^\infty te^{-3t} \cos t \, dt$ ..   (05)

b) Find $L^{-1}\left[\dfrac{1}{s\,(s+1)(s+2)}\right]$ ..   (10)

c) $Find \ L\left[\dfrac{\sin at}{t}\right]$ ..   (05)

20)   Solve $\dfrac{d^2y}{dt^2} + 4\dfrac{dy}{dt} + 3y = e^{-t}$ given y (0) = 1 and $y^1(0) = 0$ ..   (20)

21) a) Find the Fourier Cosine transform of F (x) if f (x) =1 when $|x| < 1$

0 when $|x| > 1$

Deduce that   (i) $\int_0^\infty \dfrac{\sin t}{t}\, dt = \pi/2$

(ii)$\int_0^\infty (\dfrac{\sin t}{t})^2\, dt = \pi/2$ --   (12)

b) Show that $F_s\left(\dfrac{1}{\sqrt{x}}\right) = \dfrac{1}{\sqrt{s}}$ --   (08)

22) a)Solve (mz – ny) p + (nx – lz) q = ly – mx.   --   (15)

b) Solve $p^2 + q^2 = 4$.   --   (5)

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