B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
II Year III Semester
Core Major - Paper V
DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Solve $p^2 - 3p + 2 = 0$.
2. What is the solution of $y = px + \frac{a}{p}$
3. Solve $\frac{d^2y}{dx^2} = \frac{dy}{dx}$
4. Find the particular integral of $\left(D^2 - 4\right) y = cos2x$.
5. Form the partial differential equation by eliminating the arbitrary constants from $z = ax + by + a^2 + b^2$
6. Obtain the solution of pq=2.
7. Find $L(sin^2t)$
8. Find $L^{-1}(\frac{1}{(s+1)^2+1)})$
9. Write the formula for $L(f^n(t))$
10. Find $L^{-1}(\frac{1}{s(s+a)})$
11. State the linear and shifting properties of laplace transform.
12. Define a complete solution.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. Solve : $\mathbf{e^{3x}\left(p-1\right)+p^3e^{2y}=0}$ using clairaut's form.
14. Solve $\mathbf{\left(D^2-4D-12\right)y=}sinxsin2x$
15. Find the partial differential equation by eliminating the arbitrary function from $\mathbf{f\left(x+y+z, x^2+y^2-z^2\right)=0}$
16. Find $L^{-1}(\frac{1}{s(s^2+a^2)})$
17. Using laplace transform , solve $\frac{\mathbf{d}y}{\mathbf{d}t}\mathbf{-y=}1-2\mathbf{t}$ given that y(0)= -1.

18. Find $L^{-1}(\frac{s+3}{(s^2+6s+13)^2})$
19. Solve: $(\mathbf{ye^x+e^z})\,\mathbf{d}x+(\mathbf{ze^y+e^x})\,\mathbf{d}y+(\mathbf{e^y-ye^x-ze^y})\,\mathbf{d}z=0$

Section C $(3\times 10=30)$ Marks

Answer any **THREE** questions

20. Solve $\mathbf{p^2+p}x^{\mathbf{3}}\mathbf{-2x^2y}=0$
21. Solve the equation $\mathbf{x^2}\frac{\mathbf{d^2y}}{\mathbf{dx^2}}+4\mathbf{x}\frac{\mathbf{d}y}{\mathbf{d}x}+2\mathbf{y}=\mathbf{s}in(\mathbf{l}ogx)$
22. Solve $(\mathbf{m}z-\mathbf{n}y)\,\mathbf{p}+(\mathbf{n}x-\mathbf{l}z)\,\mathbf{q}=\mathbf{l}y-\mathbf{n}x$
23. Find $\mathbf{a})\ \mathbf{L}\left(\mathbf{te^{-t}c}ost\right)$ $\mathbf{b})\ \mathbf{L}(\frac{\mathbf{c}os\mathbf{2t}-\mathbf{c}os\mathbf{3t}}{\mathbf{t}})$
24. Solve the following using laplace transform : $\frac{\mathbf{d^2y}}{\mathbf{dx^2}}+2\frac{\mathbf{d}y}{\mathbf{d}t}+5\mathbf{y}=4\mathbf{e^{-t}}$ given that y= $\frac{\mathbf{d}y}{\mathbf{d}t}$=0 when t=0

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