B.Sc. DEGREE EXAMINATION, NOVEMBER 2017.

II Year III Semester

Core Major - Paper V - DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

Time : 3 Hours Max. Marks : 75

SECTION A – (10 × 2 = 20 marks)

Answer any *TEN* questions

1. Solve $x^{2}p^{2}+3xyp+2y^{2}=0$.
2. Solve $y=\left(x-a\right)p-p^{2}$.
3. Write the auxiliary equation of $3x^{2}\frac{d^{2}y}{dx^{2}}+x\frac{dy}{dx}+y=x$.
4. Write the general solution of $\frac{d^{2}y}{dx^{2}}+y=secx$.
5. Eliminate the arbitrary function $z=f\left(x^{2}+y^{2}\right)$.
6. Solve $\frac{∂^{2}z}{∂y^{2}}siny$.
7. Write the Laplace transform of $e^{-st}$.
8. What is $L^{-1}\left[\frac{1}{\left(s+a\right)^{2}}\right]$.
9. What is $\begin{array}{c}t\\L\left(2\right)\\\end{array}$.
10. Write $L^{-1}\left(sinat\right)$.
11. Write $\begin{array}{c}t\\L\left(n\right)\\\end{array}$.
12. Find $L^{-1}\left[\frac{1}{\left(s+2\right)^{2}+16}\right]$.

SECTION B – (5 × 5 = 25 marks)

Answer any *FIVE* questions

1. Solve $xp^{2}-2yp+x=0$ .
2. Solve $\begin{array}{c}D\\\left(2-4D+3\right)y=sin3x.cos2x.\\\end{array}$
3. Solve $q=xp+p^{2}$.
4. Find $L\left(t^{2}e^{-3t}\right).$
5. Using Laplace transform solve $\frac{dy}{dx}-y=1-2t$ given that $y\left(0\right)=-1.$
6. Solve $\begin{array}{c}D\\\left(2+D+1\right)y=x^{2}\\\end{array}$.
7. Find $L^{-1}\left[\frac{1}{s\left(s+1\right)\left(s+2\right)}\right]$.

SECTION C – (3 × 10 = 30 marks)

Answer any *THREE* questions

1. Solve $2p^{2}-\left(x+2y^{2}\right)p+xy^{2}=0$.
2. Solve $\begin{array}{c}y\\\left(2+yz\right)dx+\left(xz+z^{2}\right)dy+\left(y^{2}-xy\right)dz=0.\\\end{array}$
3. Find the general solution of $\left(y+z\right)p+\left(z+x\right)q=x+y$.
4. Find $\left(\frac{1-e^{t}}{t}\right)$.
5. Solve the equation $\frac{d^{2}y}{dt^{2}}+2\frac{dy}{dt}-3ysint$given that $y=\frac{dy}{dx}0$ when $t=0.$

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