B.A./B.Sc. FIRST YEAR MATHEMATICS
SEMESTER-I,PAPER-I
MODEL QUESTION PAPER-1
DIFFERENTIAL EQUATIONS

TIME : 3 Hours *Max.Marks : 75*

PART – A

I. Answer any FIVE Questions : ***5 X 5 = 25M***

1. Solve $\frac{dy}{dx}+2xy=e^{-x^2}$.

2. Find Integrating factor of $\left(xy^3+y\right)dx+2\left(x^2y^2+x+y^4\right)dy=0$.

3. Find the Orthogonal trajectories of the family of curves $x^{2/3}+y^{2/3}=a^{2/3}$ where'a' is a parameter.

4. Solve $p^2-5p+6=0$

5. Solve $\left(D^4+8D^2+16\right)y=0$.

6. Solve $\left(D^2-5D+6\right)y=e^{4x}$.

7. Solve $\left(D^2+4\right)y=x\sin x$.

8. Solve $\left(D^2-4D+4\right)y=x^3$.

9. Solve $\left(x^2D^2-xD+1\right)y=\log x$.

10. Find the complementary function y_c of $\left(x^2D^2-3xD+5\right)y=x^2\sin\left(\log x\right)$.

PART - B

Answer any FIVE of the following Questions. ***5 ×10 =50 Marks***

11. Solve $\frac{dy}{dx}\left(x^2y^3+x^4\right)=1$.

12. Solve $x^2ydx-\left(x^3+y^3\right)dy=0$.

13. Find the orthogonal Trajectories of the families of Curves $r=\frac{2a}{1+\cos\theta}$ when "a" is Parameter.

14. Solve $\left(py+x\right)\left(px-y\right)=2p$

15. Solve $\left(D^3+1\right)y=\left(e^x+1\right)^2$.

16. Solve $\left(D^2-3D+2\right)y=\cos 3x.\cos 2x$.

17. Solve $\frac{d^2y}{dx^2}-6\frac{dy}{dx}+13y=8e^{3x}\sin 2x$.

18. Solve $\left(D^2+1\right)y=x^2e^{2x}+x\cos x$.

19. Solve by the method of variation of parameters $\left(D^2+1\right)y=\cos ecx$.

20. Solve $\left[(1+x)^2 D^2+(1+x)D+1\right]y=4\cos\log(1+x)$.