B.Sc First Semester

Mathematics Model Question Paper

Time: 3hrs. **Max. Marks: 75 M.**

Read the following instructions carefully.

Answer any five questions each question carries 5 marks: **5 x 5 = 25m.**

1. Solve x $\cos\frac{dy}{dx} + (xsinx + cosx) = 1$.
2. Solve y-$x\frac{dy}{dx} = x + y\frac{dy}{dx}$.
3. Solve p^2-5p+6 = 0.
4. Solve (D^2+4) y = xsinx.
5. Find a complete integral of the equation pq = 1.
6. Solve $(D^2+ 1)$ y = Cosecx by the method of variation of parameters.
7. Solve (y – xp) (p-1) = p.
8. Solve $(D^2 – 5D + 6)$ y = e^{4x}.

Section – B

All questions are compulsory each question have an internal choice, each question carries 10 marks **5 x 10 = 50 m.**

1.(a). Solve $\left(y + \frac{y^3}{3} + \frac{x^2}{2}\right)dx + \frac{1}{4}(x + xy^2)dy = 0$.

(or)

(b). Solve $\frac{d^2y}{dx^2} + \frac{dy}{dx}\, tanx = secx + cosx$.

2(a). Find the member of the orthogonal trajectories for the curve x+y = ce^y which passes through (0, 5).

(or)

(b). Solve $x(4ydx + 2xdy) + y^2\,(3ydx + 5xdy) = 0$.

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3 (a). Solve $\frac{d^2y}{dx^2} + 3\frac{dy}{dx} + 2y = xe^x sinx.$

(or)

(b). Solve $(D^2 + 2)y = x^2e^{3x} + e^x cos2x.$

4. (a). Solve $x^2\frac{d^2y}{dx^2} + 3x\frac{dy}{dx} + y = \frac{1}{(1-x)^2}.$

(or)

(b). Solve $\frac{dx}{dt} = 3x + 2y, \frac{dy}{dt} + 5x + 3y = 0.$

5(a). Find a complete integral of the equation $p^2x + q^2y = z.$

(or)

(b). Find the complete integral of the equation $(p^2 + q^2) = qz.$