

(i) Printed Pages : 2

Roll No.

(ii) Questions : 8

Sub. Code :

0	2	4	2
---	---	---	---

Exam. Code :

0	0	0	3
---	---	---	---

B.A./B.Sc. (General) 3rd Semester

(2123)

18

MATHEMATICS

Paper—II : (Differential Equations-I)

Time Allowed : Three Hours]

[Maximum Marks : 30

Note :— Attempt five questions in all by selecting at least two from each unit.

UNIT-I

1. (a) Define exact differential equation & solve $\frac{dy}{dx} = \frac{x - 4y + 7}{4x + y - 8}$

by proving it is exact.

3

(b) If :

$Mdx + Ndy = 0$ is of the form $f_1(xy). ydx + f_2(xy). xdy = 0$.

Then show that $\frac{1}{Mx - Ny}$ is I.F, $Mx - Ny \neq 0$.

3

2. (a) Solve $y = 2px + y^2 p^3$.

3

(b) Find Singular solution of $y = px + p^2$.

3

3. (a) Find orthogonal trajectories of $y^2 = 4ax$.

3

(b) Solve $(D^2 + 2D + 1) y = e^{-x}$.

3

4. (a) Solve $(D^2 + 4) y = x \cos x$. 3
 (b) Solve $(D^2 - 3D + 2) y = \cos (e^{-x})$. 3

UNIT-II

5. (a) Solve $(x^2 D^2 - xD + 1) y = 2 \log x$. 3

(b) Solve $(5 + 2x)^2 \frac{d^2 y}{dx^2} - 6(5 + 2x) \frac{dy}{dx} + 8y = 0$. 3

6. (a) Solve by variation of parameters $(D^2 + a^2) y = \sec ax$. 3

(b) Solve by reduction of order $(D^2 + 4) y = \sin 2x$. 3

7. (a) Solve $\{x^2 D^2 - 2x(1+x)D + 2(1+x)\} y = x^2$,

where $D = \frac{d}{dx}$. 3

- (b) Find general solution of the system :

$$\frac{dx}{dt} = 5x + 4y, \quad \frac{dy}{dt} = -x + y. \quad 3$$

8. Solve : $\sqrt{x} \frac{d^2 y}{dx^2} + 2x \frac{dy}{dx} + 3y = x, x > 0$. 6