Exam Code: 0003
Sub. Code: 0242

2012

B.A./B.Sc. (General) Third Semester

Mathematics

Paper – II: Differential Equations - I

Time allowed: 3 Hours Max. Marks: 30

NOTE: *Attempt five questions in all, selecting atleast two questions each Unit.*

x-x-x

UNIT – I

I. a) Solve $\frac{dy}{dx} = \frac{x-4y+7}{4x+y-8}$.

b) Show that $\frac{1}{Mx+Ny}$ is I.F. of Mdx + Ndy = 0 if this equation is homogeneous in x and y, where Mx + Ny is non zero. (2x3)

II. a) Solve p= tan (px -y)

b) Solve $y = 2p + 3p^2$ (2x3)

III. a) Find singular solution of $y = x^4p^2 - px$.

b) Find orthogonal trajectory of $y^2 = 4ax$. (2x3)

IV. a) Solve $(D^2 + 36)y = \sin 6x$

b) Solve $(D^2 + 3D + 2)y = \text{Sin}(e^x)$. (2x3)

UNIT – II

V. Solve $(x^2D^2 + 3xD + 1)\, y = \frac{1}{(1-x)^2}$ (6)

VI. a) Solve by reduction of order $(D^2 + 1)y = \tan x$

b) Solve by variation of parameters $(D^2 + 4)y = 4\,\text{Sec}^2 2x$ (2x3)

P.T.O.

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

b) Solve $\sqrt{x}\frac{d^2y}{dx^2} + 2x\frac{dy}{dx} + 3y = x$, x > o (2x3)

VIII. Solve $\frac{dx}{dt} = 7x - y$ and $\frac{dy}{dt} = 2x + 5y$. (6)

x-x-x