IIITS
Differential Equations
Midterm I
Set -4

Time:90 minutes
Marks: 21 marks

Section I

I. Answer all questions.Each carry 3 marks 3*3=9 marks

1.classify and solve the following equation

$$(x-y-2)\,dx = (2x-2y-3)\,dy$$

2.Find the general solution and singular solution of the following equation

$$\cos px \cos y = p - \sin px \sin y, \quad \text{where } p = \frac{dy}{dx}$$

3.Find the constant 'e' such that the following given two equations are orthogonal to each other

$y = c_1x^2 + e$ and $x^2 + 2y^2 - y = c_2$ where c_1 and c_2 are arbitrary constants

Section II

I.Answer all questions each 4 marks (4*3= 12 marks)

4.solve the following equation

$$\frac{dy}{dx} = 2y\tan x + y^2\tan^2 x$$

5.Find the general solution of the given differential equation

$$yp^2 + (x-y)p - x = 0 \quad \text{where } p = \frac{dy}{dx}$$

6. Reduce the following equation to the exact form and find its solution if y(1)=2

$$y(1+xy)\,dx + (1-xy)x\,dy = 0$$