# **MATHEMATICS PAPER IIB.- MAY 2011. COORDINATE GEOMETRY & CALCULUS.**

## **TIME : 3hrs**

Marks.75

Note: This question paper consists of three sections A,B and C.

#### SECTION A

## **VERY SHORT ANSWER TYPE QUESTIONS.**

#### Noe : Attempt all questions. Each question carries 2 marks.

1. If  $x^2 + y^2 + 2gx + 2fy - 12 = 0$  represents circle with center (2,3) find g,f and radius

2. Find the equation of the sphere that passes through the point (4,3,-1) and having center at (3,8,1)

3. Find pole of the line 2x+3y+4=0 with respect to  $y^2=8x$ 

4.Find the equation of hyperbola whose foci are at (±5,0) the transverse axis length 8

5. Find  $n^{th}$  derivative of Sin5x.Sin3x

6. Evalu

6. Evaluate 
$$\int \left(\frac{1}{\sqrt{1-x^2}} + \frac{2}{\sqrt{1+x^2}}\right)^2$$
7. Evaluate 
$$\int \left(\frac{1}{(x+1)(x+2)}\right) dx$$

8 Evaluate  $\int_{0}^{2} |1-x| dx$ 

**9**.Calculate the approximate value of  $\int_{1}^{9} x^2 dx$  using Trapezoidal rule with **4** parts

10. Find order and degree of differential equation  $\left[\left(\frac{d^2y}{dx^2}\right) + \left(\frac{dy}{dx}\right)\right]^{\frac{5}{5}} = 6y$ 

#### **SECTION B**

#### SHORT ANSWER TYPE QUESTIONS.

#### 5X4 = 20

#### Note : Answer any FIVE questions. Each question carries 4 marks.

11. Find length of chord intercepted by the circle  $x^2 + y^2 - x + 3y - 22 = 0$ 

Max.

10X2 = 20

on the line y=x-3

12. Find the equation of the tangent and normal to the parabola  $y^2=8x$  at (2,4)

13. Find eccentricity, foci, length of latus<br/>rectum and equation directrices of the Hyperbola  $x^2\mbox{-}4y^2\mbox{=}4$ 

14. Find the condition that straight line  $\frac{k}{r} = A\cos\theta + B\sin\theta$  may touch the circle r=2acos $\theta$ 15 Evaluate  $\int \sqrt{1+3x-x^2} dx$ , 16 Solve  $(x^2 - y^2)\frac{dy}{dx} = xy$ 17 Solve  $\frac{dy}{dx} + y\tan x = \cos^3 x$ SECTION C

## LONG ANSWER TYPE QUESTIONS.

5X7 =35

Note: Answer any Five of the following. Each question carries 7 marks. 18. If (1,2) (3,-4), (5,-6) and (c,8) are concyclic find "c" 19. If (3,5) is a limiting point of coaxial system of circle of which  $x^2 + y^2 + 2x + 2y - 24 = 0$  find other limiting point 20.Show that the points of intersection of perpendicular tangents to an ellipse lies on a circle 21. If  $y = e^{\sin^{-1}x}$ , then show that  $(1 - x^2)y_2 - xy_1 - y = 0$  and hence deduce that  $(1 - x^2)y_{n+2} - (2n+1)xy_{n+1} - (n^2+1)y_n = 0.$ 

**22.** Find reduction formula of  $\int \cot^n x dx$ , hence find  $\int \cot^4 x dx$ ,

23. Find  $\int_0^{\pi} \frac{x}{1+\sin x} dx$ 

24. Find area enclosed between curves

 $y^2 = 4x, y^2 = 4(4 - x)$