

MATHEMATICS PAPER IB.- MARCH 2011.

COORDINATE GEOMETRY & CALCULUS.

TIME : 3hrs

Max. Marks.75

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

SECTION A

VERY SHORT ANSWER TYPE QUESTIONS.

10X2 =20

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

1. Find area of triangle formed by line $x\cos\alpha+y\sin\alpha=p$ with coordinate axes
- 2 .Transform $2x-3y+6=0$ into normal form
- 3 .If $(2,4,-1)$ $(3,6,-1)$ $(4,5,1)$ are three vertices of a parallelogram find 4th vertex.
- 4 .Find angle between the planes $2x-y+z=6$ and $x+y+2z=7$
- 5 .Show that $\lim_{x \rightarrow \infty} (\sqrt{x^2+x}-x) = 1/2$
6. If $x=at^2$ $y=2at$ find dy/dx
- 7 .If $y=x^x$ find dy/dx
- 8 .If $y=\sin x/1+\cos x$ find dy/dx
- 9 .If $y= x^2+3x+6$ $x=10$ find $\Delta x, dy$
- 10 .show that length of subnormal at any point on the curve $y^2=4ax$ is constant

SECTION B

SHORT ANSWER TYPE QUESTIONS.

5X4 =20

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

- 11 .A(2, 3) and B(-3, 4) be two given points. Find the equation of the locus of P so that the area of the triangle PAB is 8.5 sq.units
12. If the transformed equation of a curve is $x^2+3xy-2y^2+17x-7y-11=0$, when the origin is shifted to the point (2,3), the find the original equation of the curve.
13. find the condition for three lines $ax+hy+g=0$ $hx+by+f=0$ $gx+fy+c=0$ to be concurrent.
14. Show that $\lim_{x \rightarrow a} \frac{x\sin a - a\sin x}{x-a} = \sin a - a\cos a$
15. Find the derivative of "cosax" from definition

16. Find the approximate value of $\sqrt[3]{123}$

17. If $z = \log(\tan x + \tan y)$, show that $(\sin 2x)z_x + (\sin 2y)z_y = 2$

SECTION C

LONG ANSWER TYPE QUESTIONS.

5X7 =35

Note: Answer any Five of the following. Each question carries 7 marks.

18. Find circum center of triangle formed by points (-2,3) (2,-1) and (4,0)

19. Find the point of intersection of pair of lines

$ax^2+2hxy+by^2+2gx+2fy+c=0$ and hence deduce $abc+2fgh-af^2-bg^2-ch^2=0$ from above.

20. Find the value of k, if the lines joining the origin to the points of intersection of the curve $2x^2 - 2xy + 3y^2 + 2x - y - 1 = 0$ and the line $x + 2y = k$ are mutually perpendicular

21. Find the direction cosines of two lines which are connected by relation $l+m+n=0$ and $mn-2nl-2lm=0$

22. If $y = x^{\tan x} + (\sin x)^{\cos x}$, find $\frac{dy}{dx}$

23. show that the curves $y^2 = 4(x + 1)$ and $y^2 = 36(9-x)$ intersect orthogonally

24. A wire length l is cut into two parts which are bent respectively in the form of a square and circle . What are lengths of pieces of wires so that sum of areas are least?