LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

 **B.Sc.** DEGREE EXAMINATION – **MATHEMATICS**

 FIRST SEMESTER – NOVEMBER 2010

 **MT 1500 - ALG.,ANAL.GEOMET. CAL. & TRIGN. - I**

 Date : 10-11-10 Dept. No. Max. : 100 Marks

 Time : 1:00 - 4:00

PART – A

Answer ALL the questions. (10 x 2 = 20)

1. Find yn when 
2. Show that, in the parabola y2=4ax, the subtangent at any point is double the abscissa.
3. Find the radius of curvature of xy=30 at the point (3,10).
4. Define evolutes.
5. Form equation given that 3+2c is a root.
6. If α,β,γ, are the roots of the equation x3+px2+qx+r=0 find the value of ∑α2.
7. Evaluate 
8. Prove that cosh =
9. Find the polar of the point (3,4) with respect the parabola y2=4ax.
10. Define conormal and concyclic points.

PART - B

Answer any FIVE questions. (5 x 8 = 40)

1. Show that in the curve hy2=(x+a)3 the square of the subtangent varies as the subnormal.
2. Find the radius of curvature at the point ‘t’ of the curve

x=a(cost+tsint); y=a(sint-tcost).

1. Find the coordinates of the centre of curvature at given point on the curve y=x2; 
2. Solve the equation x4+2x3-5x2+6x+2=0 given that 1+ is a root of it.
3. Find the real root of the equation x3+6x-2=0 using Horner’s method.
4. Expand sin3θ cos4θ in terms of sines of multiples of θ.
5. If sin(θ+iφ) =tanα + isecα , prove that cos2 θ cosh2φ =3.
6. Show that the area of the triangle formed by the two asymptotes of the rectangular hyperbola xy=c2 and the normal at (x1,y1) on the hyperbola is  .

PART – C

Answer any TWO questions. (2 x 20 = 40)

1. a) Prove that if y=sin(msin-1x), then (1-x2)y2-xy1+m2y=0.

b) Show that the evolute of the cycloid x=a(θ - sinθ);y=a(1-cosθ) is another cycloid.

1. a) solve 2x6-9x5+10x4-3x3+10x2-9x+2=0.

b) If α is a root of the equation x3+x2-2x-1=0 show that α2 -2 is also a root.

1. a) if u=log tan  show that tanh  = tan and θ = -i log tan

b) sum to infinity the series 

1. a) Find the locus of mid points of normal chords to the ellipse 

b) Find the polar of the point (x1, y1) with respect to the parabola y2=4ax.

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