**B.Sc. DEGREE EXAMINATION, APRIL 2017.**

**I YEAR — I SEMESTER**

**Major Paper I — TRIGONOMETRY AND ANALYTICAL GEOMETRY OF TWO DIMENSIONS**

**Time : 3 hours Max. Marks : 75**

**SECTION A — (10 × 2 = 20 marks)**

**Answer any *TEN* questions.**

1. State the expansion of *cosnθ* and *sinnθ***.**
2. State the expansion of *tannθ* in powers of *tanθ*.
3. Define sine hyperbolic and cosine hyperbolic functions.
4. Express *tanh-1 x* in terms of logarithmic functions.
5. Define the logarithms of complex quantities.
6. State the general value of logarithm of *x+iy.*
7. State Gregory’s series.
8. Prove that *π =2{1-1/32+1/5.1/32-1/7.1/33+…}.*
9. State the equation of tangent to the ellipse at the point *(x1,y1)* on it
10. Define conjugate lines.
11. Write the expansion of sinθ, cosθ interms of θ.
12. Define director circle of the ellipse.

**SECTION B — (5 × 5 = 25 marks)**

**Answer any *FIVE* questions.**

1. Expand *sin6θ* in series of cosines of multiples of *θ.*
2. Express *cosh6θ* in terms of hyperbolic cosines of multiples of *θ.*
3. Find *log(1-i).*
4. Sum to infinity the series *c sinα +c2 2 Sin2α+c33 cos3α +…*
5. Show that the conjugate lines through a focus of an ellipse are at right angles.
6. Expand *sin*4 *θcos*2*θ* in a series of cosines of multiple of *θ .*
7. Find the locus of the poles with respect to the parabola *y2 =4ax* of tangents on the circle *x2+y2 = 4a2* .

**SECTION C — (3 × 10 = 30 marks)**

**Answer any *THREE* questions.**

1. Expand cos6θ and cos5 θ in series of cosines of multiples of *θ*
2. Separate into real and imaginary parts tan *-1* *(x+iy)*
3. If prove that 
4. Sum to infinity the series

co.

1. A chord PQ of an ellipse subtends a right angle at the centre of the ellipse.

Show that the locus of intersection of the tangents at *P* and *Q* is the ellipse

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