Sample Paper – 2013
Class – XI
Subject – Mathematics

(Limits and derivatives, Complex Number, Conic Section, Straight Line, 3D Geometry)

Time: 3hrs   Maximum Marks: 100

GENERAL INSTRUCTIONS:-

1. All questions are compulsory.

2. The question paper consists of 29 questions divided into three sections A, B and C. Section – A comprises of 10 question of 1 mark each. Section – B comprises of 12 questions of 4 marks each and Section – C comprises of 7 questions of 6 marks each.

3. Question numbers 1 to 10 in Sections – A have very short questions.

4. There is no overall choice. However, internal choice has been provided in 4 question of four marks and 2 questions of six marks each. You have to attempt only one If the alternatives in all such questions.

5. Use of calculator is not permitted.

Section A

1. Evaluate $lim_{x \to 2} \left(\frac{e^x - e^2}{x-2} \right)$

2. Find the equation of a line which is parallel to y-axis and passes through (4, 3).

3. Find the distance between A(5,1,2) and B(4,6,-1).

4. Find the multiplicative inverse of 1-i.

5. Find the equation of line which cuts of intercepts 3 and 2 from the axes.

6. Find the equation of a circle with centre (h , k) and touching the x-axis.

7. Prove that the points A(3,-2,4), B(1,1,1)and C(-1,4,-2) are collinear

8. Find the equation of parabola with focus at F(3, 0) and directrix x= -3 .

9. Evaluate: $lim_{x \to 1} \left(\frac{2}{1-x2} + \frac{1}{1-x} \right)$

10. Find the least positive value of n, if $(\frac{1+i}{1-i})^n = 1$.

Section B

1 If $f(x) = \begin{cases} mx2 + n, x < 0 \\ nx + m, 0 \le x \le 1 \\ nx3 + m, x > 1 \end{cases}$, for what value f integer's m, n does the limits

$\lim_{x \to 0} f(x)$ and $\lim_{x \to 1} f(x)$ exists.

2. Express (3-4i)/ {(4-2i) (1+i)} in the standard form (a + i b):

3. Find the equation of a line which is perpendicular to the line joining (4, 2) and (3, 5) and cuts off an intercept of length 3 on y-axis.

4. Find the equation of the curve formed by the set of all the points which are equidistant from the points A (-1, 2, 3) and B (3, 2, 1).

5. If y= 2x is a chord of the circle $x^2+y^2-10x=0$. Find the equation of the circle passing with this chord as diameter.

6. Find the equation of the ellipse whose foci are (0, -+ 5) and the length of whose major axis is 20.

7. Find the value of m so that the lines y=x+1, 2x+y=16 and y=mx-4 may be concurrent.

8. The vertex of a parallelogram ABCD are A(3,-1,2) B(1,2,-4) and C(-1,1,2). Find the coordinate of the fourth vertex D.

9. Find the modulus and argument of the (1-i)/ (1+i) and express in polar form.

10. A straight line passes through the point (l, m) and this point bisects the portion of the line intercepted between the axes. Show that the equation of line is x/2l+y/2m=1.

11. Find the equation of hyperbola with centre at the origin, length of the transverse axis 6 and one focus at (0, 4).

12. Differentiate: $3^x/(x+ \tan x$

Section C

1. Differentiate Sin x^2 with first principle.

2. Show that a real value of x will satisfy the equation $\frac{1-ix}{1+ix}$ =a-ib if $a^2 +b^2=1$, where a, b are real.

Or

Evaluate $\sqrt{-5 + 12i}$

3. If p is the length of the perpendicular from the origin to the line x/a +y/b =1, then prove that $1/p^2 =1/a^2+1/b^2$.

4. The cable of uniformly loaded suspension bridge hangs in the form of a parabola. the roadway which is horizontal and 100 m long is supported by vertical wires attached to the cable, the longest wire being 30 m and the shortest being 6 m. find the length of supporting wire attached to the roadway 18 m from the middle.

5. Find the coordinate of the focus and the vertex, the equations of the directrix and the axis, and length of latus rectum of y^2=12x.

6. Find the ratio in which the joins of A (2, 1, 5) and B (3, 4, 3) is divided by the plane 2x+2y-2z=1. Also find the coordinates of the point of division.

7. The line through (h, 3) and (4, 1) intersects the line 7x -9y -19 = 0 at right angle. Find the value of h.

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