**Sample Paper – 2013  
Class – XI  
 Subject – MATHEMATICS**

**TIME : 3 HOURS FULL MARK :100**

**GROUP :A (1X10)**

1. Is “the collection of all interesting books” a set ? Justify your answer.
2. Show that
3. If , find n.
4. If 1/3, X1, X2, 9 are in GP then find X2.
5. Differentiate with respect to x.
6. Find the equation of a circle with center (2, 4) and radius 5.
7. Show that
8. Find the value of
9. Evaluate (999)4.
10. In which plane does the point (0,5.-4) lie ?

**GROUP :B (4 X12)**

1. If P(A)= P(B), Show that A=B.

OR

Using properties of sets, prove that A U(B-A)=(AUB).

1. If prove that x2+y2=1.
2. Out of 7 consonants and 4 vowels how many words of 3 consonants and 2 vowels can be formed?
3. Find the middle term in the expansion of

OR

Find the coefficient of x7 in the expansion of (

1. Prove that
2. Find the equation of a line whose perpendicular distance from the origin is units and the angle between the positive direction of the x-axis and the perpendicular is 135.
3. Find the equation of the hyperbola whose foci are and the length of the latus rectum is 12 units.

OR

Find the equation of the ellipse with centre at the origin, major axis on the y-axis and passing through the points (3,2) and (1,6).

1. If A and B are two events associated with a random experiment for which P(A)=0.6, P(A or B)=0.85 and P(A and B)= 0.42, find P(B).
2. Write the converse, contradiction and contrapositive of the following statement

If a quadrilateral ABCD is a square, then all of its sides are equal”.

1. Find the derivative of from the first principle.
2. Evaluate

OR

Evaluate

1. Find the sum to n terms of the series whose nth term is .

**GROUP:C (6X7)**

1. A class has 175 students. The following description gives the number of students studying one or more of the subjects in this class.

Mathematics 100 ; Physics 70; Chemistry 46; Mathematics and Physics 30; Mathematics and Chemistry 28; Physics and Chemistry 23; Mathematics,Physics and Chemistry 18.

Find (i) how many students are enrolled in Mathematics alone; Physics alone and Chemistry alone.

(ii) the number of students who have not offered any of these subjects.

1. Using the principle of mathematical induction, prove the following for n is a natural number
2. A card is drawn from a deck of 52 cards. Find the probability of getting a king or a heart or a red card.
3. Calculate the mean, variance and standard deviation for the following frequency distribution

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| class | 0-30 | 30-60 | 60-90 | 90-120 | 120-150 | 150-180 | 180-210 |
| Frequency | 2 | 3 | 5 | 10 | 3 | 5 | 2 |

1. If p1 and p2 are the lengths of perpendiculars from the origin to the line and respectively then prove that 4P12 +P22 =a2.

OR

The points A(2,3), B(4,-1), and C(-1,2) are the vertices of triangle ABC. Find the length of perpendicular from C on AB and hence find the area of triangle ABC.

1. Differentiate the following:
2. Solve the following simultaneous linear equations graphically

OR

A solution 8% boric acid is to be diluted by adding 2% boric acid solution to it. The resulting mixture is to be more than 4% but less than 6% boric acid. If we have 640 litres of the 8% solution, how many litres of the 2% solution will have to be added ?