**SAMPLE PAPER-2013**

**CLASS-XII**

**Subject:-Mathematics**

**M.M : 100 TIME: 3h**

*GENERAL INSTRUCTION:*

1. *All questions are compulsory.*
2. *This question paper consists of 29 questions divided into three section A, B, and C. Section A comprises of 10 question of one mark each, section B comprises of 12 questions of four marks each and section C comprises of 7 questions of six marks each.*
3. *All questions in Section A are to be answered in one word, one sentence or as per the exact requirement of the question.*
4. *There is no overall choice. However, internal choice has been provided in 04 questions of four marks each and 02 questions of six marks each. You have to attempt only one of the alternatives in all such questions.*
5. *Use of calculators is not permitted. You may ask for logarithmic tables, if required.*

**SECTION A**

Q1: Prove that :

Q2: Give example of two functions and such that is injective but is not injective.

Q3: If a matrix has 18 elements, what are possible orders it can have? What, if it has 5 elements?

Q4: If A is an invertible matrix of order 2, then find det (A–1) .

Q5: Find if .

Q6: Show that is strictly increasing on R.

Q7: Find, if and .

Q8: Show that the line through the points is parallel to the line through the points   
 .

Q9: Write the order and degree of the differential equation,

Q10: State Lagrange’s mean value theorem.

**SECTION–B**

Q11: Show that the relation R defined by R is divisible by } is an equivalence   
 relation.

Q12: Prove that

OR

Prove that :

Q13: Using properties of determinants, prove that

where is any scalar.

Q14: Differentiate w.r.t.

Q15: If and then prove that

OR   
 Differentiate with respect to cos-1 (

Q16: Find the values of so that the function   
 is continuous for

Q17: Evaluate:

Q18: Evaluate:

OR   
 Evaluate :

Q19: Evaluate :

Q20: If find a vector such that

Q21: Find the equations of the line passing through the point and perpendicular to each of the   
 line

OR

Find the shortest distance between the following lines:

Q22: There is a group of 50 people who are patriotic out of which 20 believe in non violence. Two   
 persons are selected at random out of them, write the probability distribution for the selected   
 persons who are non violent. Also find the mean of the distribution.

Explain the importance of Non violence in patriotism.

**SECTION-C**

Q23. The sum of three numbers is 6. If we multiply third number by 3 and add second number to it,   
 we get 11. By adding first and third numbers, we get double of the second number. Represent   
 it algebraically and find the numbers using matrix method.

Q24. Using integration compute the area bounded by the lines and

Q25. If length of three sides of a trapezium other than base are equal to 10cm, then find the area of the trapezium   
 when it is maximum.

OR

Show that normal at any point to the curve is at a   
 constant distance from the origin.

Q26. Show that the general solution of the differential equation

Q27. Find the distance of the point from the line measured ‖ to the plane

Q28. Ram belongs to a very small village of J&K. In his village, there are animals like cows, oxen, buffaloes, goats etc in each house. So he thinks to start a business of selling fodder machines. He has only `5760 to invest and a space for at most 20 items. An automatic machine costs him `360 and a manually operated machine `240. It is expected that he can sell an automatic machine at a profit of `22 and a manually operated machine at a profit of `18. Find the number of machines he should sell to maximize his profit. Keeping the rural background in mind justify the values to be promoted to for the selection of the manually operated machine.

Q29 Let X denotes the number of hours you study during a randomly selected school day. The   
 probability that X can take the values x has the following form , where k is some unknown   
 constant.

P(x) =

1. Find the value of k
2. What is the probability that you study at least 2h? Exactly 2h? At most 2h?

Why early morning is considered as the best time to study , explain?

OR

There are three boxes , the first one containing 1white, 2 red and 3 black balls, the second one containing 2white, 3 red and 1 black and the third one containing 3white, 1red and 2 black balls. A box is chosen at random and from it two balls are drawn which are found to be one red and other white. What is the probability that these come from the second box? Explain the meaning of three colours of our national flag.

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