**SAMPLE PAPER-2013  
CLASS-XII  
SUBJECT- MATHEMATICS**

**Time : 3 Hours M.M. 100**

**Instructions** *-*All questions are compulsory, there are three sections A, B and C.

This question paper consists of **29** questions. Questions from 1 to 10 are of 01 marks each, questions from11 to 22 are of 04 marks each and questions from 23 to 29 are of 06 marks each.

**SECTION – A**

1. Find the positive value of x if = 0.

2.If A =, find ATA .

3. A matrix A of order 3 and . Find the value of .

4. If x = b sint , y = find

5. Evaluate:

6. Evaluate:

7. Write the order and degree of the differential equation - 3

8.If = = find a vector which is perpendicular to both and .

9. If f and g are function on R such that f(x) = sin x and g(x) = x2,find gof

10. Find the value of sin-1(

**SECTION-B**

11. Simplify : tan-1 

12. If A= and I = ,then find A2 - 5A + 6I

**OR**

Using properties of determinants , prove:

= (1 + a2+ b2 )3

13. Find the points on the curve at which the tangents are parallel to x-axis.

14. Find the approximate value by using differentiation.

15. If y = cot -1 ,find

**OR**

Find the value of λ , so that the function f(x) = 3, if x = ,

is continuous at x = .

16. Evaluate: 

17. Evaluate: .

18. = and = ,find the value of λ if + is perpendicular to - .

**OR**

Find the area of the triangle with position vectors of the vertices , and .

**19.** Evaluate: Evaluate:

.

20. Solve the differential equation : (x + y) dy + (x – y) dx = 0

**OR**

Solve the differential equation : cos x + y = sin x

21 Check whether the relation R on R defined by R ={(a,b) :a b3 } is reflexive, symmetric or transitive.

22. Two dice are thrown simultaneously. Let x denote the number of sixes. Find the probability distribution of x. Also find the mean and variance of x.

**SECTION – C**

23 In a bulb factory ,machines A,B and C manufacture 60% ,30% and 10% bulbs respectively. 1%,2% and 3% of the bulbs produced respectively by A,B and C are found to be defective. A bulb is picked up at random from the total production and found to be defective. Find the probability that, this bulb was produced by the machine A.

24. A window has the shape of a rectangle surrounded by a semicircle. If the perimeter of the window is 10 unit, then find its dimension in order that the area may be maximum .

**OR**

Show that a closed right circular cylinder of given total surface are and maximum volume is such that

its height is equal to diameter of its base.

25. If A = and B= , find AB.

By using its product solve: x - y + 2z = 1, 2 y - 3z = 1 , 3x – 2y + 4z = 2

26. Using integration find the area lying above x-axis and included between the circle

x2 + y2 = 8x and y =4x2

**OR** Find the value of by using limit sum

27. Find the equation of the plane passing through the point (-1, 3, 2 ) and perpendicular to the planes x + 2y + 3z =5 and 3x +3y +z =0

28. Find the shortest distance between the lines, = () + λ () and

= () + μ ().

OR Find the vector equation of a plane passing through the intersection of the planes

.() = 6 and . () = -5 and the point (1, 1, 1)

29. A man has Rs.1500 for purchase of rice and wheat. A bag of rice costs Rs.180 and a bag of wheat costs Rs.120. He has storage capacity of 10 bags only. He earns a profit of Rs.11 and Rs.9 per bag of rice and wheat, respectively. Formulate an L.P.P to maximize the profit and find the maximum profit.

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