Sample Paper – 2013
Class – XII

Mathematics

Maxmarks: 100 Test Paper no-3   time: 3hours

Section-A

Q1. If |A|= 3 find the value of |5A| if A is a matrix of 2×2 order

Q2. Prove that 2tan-1 ½ + tan-11/7 = tan-1 31/17

Q3. Solve for x and y, given that 1 = 3

 2 5

Q4. If a\*b = 2a2-b2 find the value of 3\*4

Q5. If A and B are symmetric matrices, prove that (AB-BA) is skew-symmetric matrix

Q6. If a , b , c are three mutually perpendicular vectors of the same magnitude, prove that (a + b + c ) is equally inclined to the vectors a , b and c

Q7. Find the approximate value of √37

Q8. If | a | = 5 | b | = 13 and | a × b | = 25 find a ·  b

Q9.evaluate

Q10. Find a vector of magnitude 15, which is perpendicular to both vectors (4î –ĵ+8k) and (-ĵ+k)

 Section –B

Q11. Prove that tan-1 = tan-1 -x

Q12using the properties of determinants prove that 1+a2-b2  2ab -2b

 2ab 1-a2+b2 2a = (1+a2 +b2)3

 2b -2a 1-a2- b2

Q13.If y= tan -1  , find

Or

If y= (sinx+cosx), prove that y״-2y׳+2y=0

Q14. For what value of k is the following function continuous at x=0

 F(x) = at x=0 f(x) =k

Q15. Find the intervals on which the function(x)= -2x3-9x2-12x+1 is (a) strictly increasing (b) strictly decreasing

Q16. Evaluate

Or

 This question can be appear in the following form

Solve the following initial value problem: +y = , y(0)=0

Q18. Solve the following initial value problem: (x-y)(dx+dy)= dx-dy y(0)=-1

Or

Solve xdy-ydx=√x2+y2

Q19. Find | x |= , if for a unit vector a ( x- a ) ( x – a ) =15

Or

Show that the angle between two diagonals of a cube is cos -1

Q20. Find the value of λso that the lines = = and = = are at right angle

Q21. Let A be the set of all lines in xy – plane and let R be a relation In A , defined by R={(L1, L2):L1| | L2}

 Show that R is an equivalence relation in A and find the set of all lines related to the line y= 3x +5

Q22. A coin is tossed four times .let x denote the number of heads. Find the mean and variance of x

Section –c

Q23.if A= find A-1 and using results solve the following system of equation

 X+2y+z=1, 2x-y+z=5, 3x+y-z=0

Or

Using elementary rows transformations find the inverse of

Q24.using integration, find the area of ABC, the equations of whose sides AB, BC and AC given by y=4x+5

 , x+y=5 and 4y= x+5 respectively

Q25. Prove that =

Or

Solve the following integral as limit of a sum

. Find the equation of the plane through the line of intersection of planes 2x + y-z =3 and 5x-3y +4z +9=0, and parallel to the line = =

27. Suppose that the reliability of a HIV test is specified as follows: of people having HIV, 90% of the test detects the disease but 10% go undetected of people free of HIV, 99% of the tests are judged HIV-ve but 1% are diagnosed as showing HIV+ve from a large population of which only 0.1% have HIV ,one person is selected at random ,given the HIV test , and the pathologist reports him/her as HIV+ve .what is the probability the person actually has HIV ?

 Find the maximum area of an isosceles triangle inscribed in the ellipse + = 1

Show that height of the cylinder of greatest volume which can be inscribed in a right circular cone of height h and semi vertical angle α is one –third that of the cone and the greatest volume of cylinder is

Q29. A dietician wishes to mix two types of food, X andY, in such a way that the vitamin contents of the mixtures contains at least 8 units of vitamin A and 10 units of vitamin C. food X contains 2 units /kg of vitamin A and 1unit /kg of vitamin c, while food Y Contains 1unit/kg of vitamin A and 2 units/kg of vitamin c. It costs Rs.5 per kg to purchase the food X and Rs7 per kg to purchase the food Y. determine the minimum cost of such a mixtures



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