KENDRIYA VIDYALAYA SANGATHAN – AHMEDABAD REGION
SESSION ENDING EXAMINATION : MARCH – 2016
CLASS : XI
SUBJECT : MATHEMAITCS

TIME : 3 HOURS   **MAX. MARKS : 100**

GENERAL INSTRUCTIONS :

1. All questions are compulsory.
2. The question paper consists of 26 questions divided into 3 sections A, B and C.
3. Section A comprises of 6 questions of one mark each, section B comprises 13 questions of 4 marks each and section C comprise 7 questions of 6 marks each.
4. All questions in the section A are to be answered in one word, one sentence or as per the exact requirement of the question.
5. There is no overall choice. However, internal choice has been provided in 2 questions of four marks and 2 questions of 6 marks. You have to attempt only one of the alternatives in all suchquestions.
6. Use of calculators is not permitted. You may ask for Logarithmic tables, if required.

SECTION A

Q.1   Write the following set in Roster form.

A = The set of all letters in the word TRIGONOMETRY.

Q.2   A coin is tossed 3 times and outcomes are recorded. How many possible outcomes are there?

Q.3   Find the slope of the line passing through the points (3, -2) and (-1, 4)

Q.4   Write the negation of the statement: p: Every natural number is an integer.

Q.5   Find the component statements of the following compound statement p: All prime numbers are either even or odd.

Q.6 Two dice are thrown. The events A and B are described as follows:

A: getting an even number on the first die

B: getting an odd number on the first die.

Are A and B mutually exclusive?

SECTION B

Q.7 In a survey of 600 students in a school, 150 students were found to join classes of yoga and 225 to join classes of creative thinking skills, 100 were taking both. Find how many students were neither taking yoga nor creative thinking skills?

Q.8 Let A = {1, 2, 3, 4, 6}. Let R be the relation on A defined by {(a, b) : a, b ∈ A, a divides b}. (i) Write R in roster form. (ii) Find the domain of R. (iii) Find the range of R.

Q.9 $\dfrac{cos4x+cos3x+cos2x}{sin4x+sin3x+sin2x} = \cot 3x$

Q.10 If $x-iy=\sqrt{\dfrac{a-ib}{c-id}}$, find $(x^2+y^2)^2$.

OR

Find the modulus and argument of the complex number $\dfrac{1+2i}{1-3i}$

Q.11 A committee of 7 has to be formed from 9 boys and 4 girls. In how many ways can this be done when the committee consists of (i) exactly 3 girls (ii) atleast 3 girls?

OR

How many words, with or without meaning, can be formed using all the letters of the word EQUATION at a time so that the vowels and consonants occur together?

Q.12 Find the equation of the circle which passes through the points (4, 1) and (6, 5) and whose centre lies on the line
4x + y =16.

Q.13 Using the principle of mathematical induction prove that :
$10^{2n-1}+1$ is divisible by 11.

OR

Using the principle of mathematical induction prove that :
$$\frac{1}{1.2.3}+\frac{1}{2.3.4}+\frac{1}{3.4.5}+\ldots\ldots\ldots+\frac{1}{n(n+1)(n+2)}=\frac{n(n+3)}{4(n+1)(n+2)}$$

Q.14 Solve the following system of inequalities graphically:
$x +2y\le 10$; $x + y \ge1$; $x -y\le 0$; $x \ge0$; $y \ge0$

Q.15 If A.M and G.M of roots of a quadratic equation are 8 and 5 respectively, then obtain the quadratic equation.

OR

How many terms of the A.P **-6, -11/2, -5** , ... are needed to give the sum **-25**?

Q.16 Find the equation of the line passing through the point (2,2) and cutting off intercepts on the axes whose sum is 9.

Q.17 Find the derivative of the function with respect to x.
$$y =\frac{\sin x+\cos x}{sinx-cosx}$$

Q.18 Using first principle find the derivative y = cos x

Q.19 A die is thrown, find the probability of (i) a prime number will appear (ii) a number more than 6 will appear (iii) a number greater than or equal to 3 will appear (iv) odd number will occur.

SECTION C

Q.20 Prove that $2\cos\frac{\pi}{13}\cos\frac{9\pi}{13}+\cos\frac{3\pi}{13}+\cos\frac{5\pi}{13}=0$

Q.21 Find the values of x and y for which the complex numbers

$-3+ix^2 y$ and $x^2 +y +4i$ are conjugate of each other.

Q.22 The co efficient of the (r-1)th, rth and (r+1)th terms in the expansion

of $(x +1)^n$ are in the ratio 1:3:5. Find n and r.

OR

Find $(a + b)^4 - (a - b)^4$ using Binomial theorem. Hence evaluate

$(\sqrt{3} +\sqrt{2})^4 - (\sqrt{3} - \sqrt{2})^4$.

Q.23 Find the equation of the set of points P, the sum of whose distances from

A(4,0,0) and B(-4,0,0) is equal to 10.

Q.24 Find the angle between the lines $\sqrt{3}x +y =1$ and $x +\sqrt{3}y=1$.

Q.25 The first term of a G.P is 1. The sum of the third and the fifth term is 90.

Find the common ratio of the G.P

Q.26 Find the mean deviation about the median for the following data :

x_i	5	7	9	10	12	15
y_i	8	6	2	2	2	6

OR

Find the mean and variance for the following data :

classes	0-10	10-20	20-30	30-40	40-50
frequencies	5	8	15	16	6

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