RISE OF NATION ACADEMY

"We Create the Impeccable Creature"

Test Paper

Standard – XI

MATHS

Topic – full course

Date – 13/01/2018 **Time – 3:00 hrs.**

Max. Marks –100 **Min. Marks - 75**

Q.1 Two finite set having m and n elements. Total no. of subset of the first set is 56 more than the total no. subset of second set. Find the values of m and n. (2)

Q.2 Write the set A = {X:X € Z ,X^2 < 20 } in roster form. (2)

Q.3 Prove that $sin^2 \frac{\pi}{6}$ $+cos^2 \frac{\pi}{3}$ $-tan^2 \frac{\pi}{4}$ $= \frac{-1}{2}$ (2)

Q.4 Solve 4 sin x sin 2x sin 4x = sin 3x (4)

Q.5 Prove that sin 10° sin 30° sin 50° sin 70° =1/16 (3)

Q.6 $(\cos \alpha + \cos \beta)^2 + (\sin \alpha + \sin \beta)^2 = 4 \cos^2 (\frac{\alpha - \beta}{2})$ (3)

Q.7 $\sin\frac{\pi}{14} \sin\frac{3\pi}{14} \sin\frac{5\pi}{14} \sin\frac{7\pi}{14} \sin\frac{9\pi}{14} \sin\frac{11\pi}{14} \sin\frac{13\pi}{14} = 1/64$ (4)

Q.8 Prove by mathematical induction that for all n € N , Sin θ +sin 2θ + sin 3θ +……..+ sin nθ = $\frac{sin\left(\frac{n+1}{2}\right)\theta \quad sin\frac{n\theta}{2}}{sin\frac{\theta}{2}}$ (4)

Q.9 Prove by principal of mathematical induction 4 + 8 + 12 + ………+ 4n = 2n (n+1) for all n€N (2)

Q.10 Find the modulus and argument of complex number and convert them into polar form of. $\frac{i-1}{cos\frac{\pi}{3}+ i\, sin\frac{\pi}{3}}$ (2)

Q.11 Find Square root of complex number $\frac{1+i}{1-i}$. (2)

Q.12 Solve Quadratic equation $x^2 - (7-i)x + (18-i) = 0$ (4)

Q.13 Solve the following system of equation $\frac{5x}{4} + \frac{3x}{8} > \frac{39}{8}$, $\frac{2x-1}{12} - \frac{x-1}{3} < \frac{3x+1}{4}$ (4)

Q.14 Find all pairs of consecutive odd integers , both of which are smaller than 18 ,such that their sum is more than 20. (2)

Q.15 How many no. are there between 100 and 1000 which are exactly one of their digits as 7. (2)

Q.16 A committee of 5 is to be formed out of a 6 gents and 4 ladies . in how many ways this can be done ,when
(i) at least two ladies are included ? (ii) at most two ladies are included ? (4)

Q.17 If a_1 , a_2 , a_3 , …….. a_n are in AP with common difference d , then the sum of series. Sind (cosec a_1 cosec a_2 cosec a_1 + cosec a_2 cosec a_3 + …….+ cosec a_{n-1} cosec a_n) is equal to cot a_1 - cot a_n . (4)

Q.18 The (m+n)th and (m-n)th term of a GP are p and q respectively .Show that mth and nth terms are $\sqrt{pq}$ and $p\,(p/q)^{m/2n}$ (3)

Q.19 If $x = 1 + a + a^2 + \ldots\ldots \infty$, and $y = 1 + b + b^2 + \ldots\ldots\infty$ prove that $1 + ab + a^2 b^2 + \ldots\ldots\infty = \frac{xy}{x+y-1}$ (3)

Q.20 A line is such that its segments between the lines 5x –y + 4 =0 and 3x +4y -4 =0 is bisected at the point (1,5) . Obtain its equation. (5)

Q.21 The area of triangle formed by the coordinate axes and a line is 6 square units and length of hypogenous is 5 units. Find the equation of line. (4)

Q.22 A line forms a triangle of area $54\sqrt{3}$ square units with the coordinate axes. Find the equation of the line if the perpendicular drawn from the origin to the line makes an angle of 60° with the X-axis . (5)

Q.23 Find the equation of medians of triangle formed by the lines x+ y -6 =0 , x -3y -2 =0 and 5x -3y + 2=0 (5)

Q.24 Find incenter ,centroid and circum-center and ortho-center of the triangle whose side of the equations
3x-y =0 ,12y + 5x =0 and y -15 =0 (5)

Q.25 Find the equation to the circles which pass through the origin and cut off equal chords of length a from the straight lines y=x and y = -x (4)

Q.26 Find the equation of circle circumscribing the triangle formed by the lines x + y =6, 2x + y = 4 ,x +2y =5 (3)

Q.27 Find the area of an equilateral triangle inscribed in the circle $x^2 + y^2 + 2gx + 2fy + c = 0$. (3)

Q.28 Prove that the equation to the parabola whose vertex and focus are on the x-axis at a distance a and a’ from the origin respectively is $y^2 = 4\,(a' - a)\,(x - a)$. (4)

Q.29 Find the equation of the parabola whose focus is (1, -1) and whose vertex is (2,1) .also find its axis and latus- rectum. (3)

Q.30 Find the vertex, focus, Directrix, axis and latus –rectum of the parabola $y^2 = 4x + 4y$ (3)