Aryan

RAM-EESH INTERNATIONAL SCHOOL, GREATER NOIDA
ANNUAL EXAMINATION-2016-17
SUBJECT-MATHS
CLASS-XI

TIME-3HOURS **SET-A** **M.M-90**

SECTION-A (1x4=4)

1. What is the value of $2\,Sin^2\frac{3\Pi}{4} + 2\,Cos^2\frac{\Pi}{4}$.
2. Find (A-B) ∪ (B-A) If $A = \{1,3,4\} and\ B = \{2,5,9,11\}$
3. Find the total number of terms $(x+a)^{100} + (x-a)^{100}$
4. A wheel makes 360 revaluations in one minute. Through how many radians does it turn in one Second?

SECTION-B (2x8=16)

5. If $n(A) = m\ and\ n\ (B) = n$. Find the total number of non-empty relations that can be defined from A to B.
6. Find the 4th term from end in the expansion of $\left(\frac{3}{x^2} - \frac{x^3}{6}\right)^7$
7. Find the length of latus rectum, eccentricity of the ellipse $4x^2 + 9y^2 = 144$
8. Solve $Sec^2 2x = 1 - Tan2x$
9. Show that $A\ (3,-2,4) B\ (1,0,-2)\ C\ (-1,2,-8) are\ collinear.$
10. Find the multiplicative Inverse of Z=$\left(2+\sqrt{3}\,i\right)^2$
11. Find the domain and range of the Function $F(x) = \sqrt{16-x^2}$
12. If ∝ and B are complex numbers with |B|=1 find $\left|\frac{B-\alpha}{1-\bar{\alpha}B}\right|$

SECTION-C (4x11=4)

13. Prove that $Cos^2x + Cos^2s\left(x+\frac{\Pi}{3}\right) + Cos^2\left(x-\frac{\Pi}{3}\right) = \frac{3}{2}$.
14. By P.M.I prove that $2.7^n + 3.5^n - 5$ is divisible by 24.
15. Find real values of θ such that $\frac{3+2i\,Sin\theta}{1-2i\,Sin\,\theta}$ is a Purly real.
16. A solution of 8% boric acid is to be diluted by adding a 2% boric acid solution to it. The resulting mixture is to be more than 4% but less than 6% boric acid. If we have 640 letres of 8% solution, how many letres of 2% solution will be added?
17. If the letters of word 'RAGHIT are arranjed in all possible ways as lasted in a dictionary, then what is the rank of the word RAGHIT.
18. Find n, if the ratio of the Fifth term from the beginning to the fifth term from the end in the expansion of $\left(4\sqrt{2} + \frac{1}{4\sqrt{3}}\right)^n$ $is\ \sqrt{6};1$
19. Find the sum of n terms
$\left(x+\frac{1}{x}\right)^2, \left(x^2+\frac{1}{x^2}\right)^2, \left(x^3+\frac{1}{x3}\right)^2 \ldots\ldots\ldots\ldots$
20. If p and q are the length of perpendicular from the origin to the line $x\cos\theta - y\,Sin\,\theta = k\,Cos2\theta$ and $Sec\theta + y\,Cosece\theta = k\ Prove\ that\ p^2 + 4q^2 = k^2$.

21. Find the Equation of Hyperbola whose foci are $(0, \pm \sqrt{10})$ *and passing through the point* $(2, 3)$

Or

Using section formula, show that the point (2, -3, 4) (-1, 2, 1) and $(0, \frac{1}{3}, 2)$ are collinear.

22. Find the derivative of $x \sin x$ *by first principles* .

Or

Find the domain and range of the following function.

(a) F $(x) = \sqrt{x-1}$ (b) $f\ (x) = \sqrt{9-x^2}$

23. Find the probability that when a hand of 7 cards is drawn from a well-shuffled deck of 52 cards it contains.

(a) Exactly 3 kings (b) At least .3 kings.

SECTION-D (6x6=36)

24. A college awarded 38 medals for Honesty, 15 for punctuality and 20 for obedience. If these meddle were bagged by a total of 58 students and only 3 students got medals for all three values, how many students received medals for exactly two of the three values. Which value you prefer to be awarded most and why?

25. (a) Prove that

$$Tan\ 3x\ Tan2x\ Tan\ x = Tan3x - Tan2x - Tanx$$

(b) Prove that

$$\frac{Sin\ x - Sin3x}{Sin^2x - Cos^2x} = 2\ Sin\ x$$

26. If the 2nd, 3rd and 4th term in the expansion $(x+a)^n$ *are* 240, 720, *and* 1080 respectively, find the values of x a and n.

27. Show that

$$\frac{1 \times 2^2 + 2 \times 3^2 + \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots + n \times (n+1)^2}{1^2 \times 2 + 2^2 \times 3 + \cdots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots + n^2 \times (n+1)} = \frac{(3n+5)}{(3n+1)}$$

28. The slope of a line is double of the slope of another lines. If the Tangent of the angle b/w them is $\frac{1}{3}$, find the slope of the lines.

29. Evaluate

(a) $\lim_{x \to -2} \frac{\frac{1}{x} + \frac{1}{2}}{(x+2)}$

(b) If $y = \frac{(4x + 5\ Sin\ x)}{3x + 7Cos\ x)}$ *find* $\frac{dy}{dx}$.