

## FIRST REVISION EXAM - 2023

STD - X

TIME : 3.00 Hrs

MATHS

MARKS : 100

PART - I

I. Answer all the questions.

14 x 1 = 14

- The range of the relation  $R = \{ (x, x^2) \mid x \text{ is a prime number less than } 13 \}$  is  
a)  $\{ 2, 3, 5, 7 \}$     b)  $\{ 2, 3, 5, 7, 11 \}$     c)  $\{ 4, 9, 25, 49, 121 \}$     d)  $\{ 1, 4, 9, 25, 49, 121 \}$
- The domain of the function  $f(x) = 1 / x(x + 1)$  is  
a)  $\{ 0, -1 \}$     b)  $R - \{ 0, -1 \}$     c)  $R - \{ 0 \}$     d)  $R - \{ -1 \}$
- The next term of the sequence  $3/16, 1/8, 1/12, 1/18$  is  
a)  $1/24$     b)  $1/27$     c)  $2/3$     d)  $1/81$
- If 10th term of A.P. is 52 and 16th term of A.P. is 82 then the nth term of this A.P. is  
a)  $n + 2$     b)  $5n - 2$     c)  $5n + 2$     d)  $5n$
- Which of the following should be added to make  $x^4 + 64$  a perfect square  
a)  $4x^2$     b)  $16x^2$     c)  $8x^2$     d)  $-8x^2$
- If  $A = (1 \ -2 \ 3)$ ,  $B = \begin{pmatrix} -1 \\ 2 \\ -3 \end{pmatrix}$  then  $A + B^T = ?$   
a)  $(0 \ 0 \ 0)$     b)  $\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix}$     c)  $(2 \ 4 \ 6)$     d) not defined
- If in  $\triangle ABC$  is an isosceles triangle with  $\angle C = 90^\circ$  and  $AC = 5$  cm, then  $AB$  is  
a) 2.5 cm    b) 5 cm    c) 10 cm    d)  $5\sqrt{2}$  cm
- If A is a point on the Y axis whose ordinate is 8 and B is a point on the X axis whose abscissae is 5 then the equation of the line AB is  
a)  $8x + 5y = 40$     b)  $8x - 5y = 40$     c)  $x = 8$     d)  $y = 5$
- The area of quadrilateral formed by the points  $(-1, 1)$ ,  $(1, 1)$ ,  $(1, -1)$  and  $(-1, -1)$  is  
a) 0 sq. units    b) 4 sq. units    c) 25 sq. units    d) 1 sq. units
- $a \cot \theta + b \cot \theta = p$  and  $b \cot \theta + a \operatorname{cosec} \theta = q$  then  $p^2 - q^2$  is equal to  
a)  $a^2 - b^2$     b)  $b^2 - a^2$     c)  $a^2 + b^2$     d)  $b - a$
- The total surface area of a hemi-sphere is how much times the square of its radius  
a)  $\pi$     b)  $4\pi$     c)  $3\pi$     d)  $2\pi$
- If the radius of the base of a right circular cylinder is halved keeping the same height, then the ratio of the volume of the cylinder thus obtained to the volume of original cylinder is  
a) 1 : 2    b) 1 : 4    c) 1 : 6    d) 1 : 8

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13. Variance of first 20 natural numbers is  
 a) 32.25      b) 44.25      c) 33.25      d) 30
14. Kamalam went to play a lucky draw contest 135 tickets of the lucky draw were sold. If the probability of kamalam winning is  $\frac{1}{9}$ , then number of tickets bought by kamalam  
 a) 5      b) 10      c) 15      d) 20

**PART - II**

**Answer any Ten Questions. Q.No. 28 is compulsory**

**10 x 2 = 20**

15. Let  $A = \{ 1, 2, 3, 4, \dots, 45 \}$  and R be the relation defined as "is square of a number" on A. Write R as a subset of  $A \times A$ . Also, find the domain and range of R.
16. Let f be a function from R to R defined by  $f(x) = 3x - 5$ . Find the values of a and b given that (a, 4) and (1, b) belong to f.
17. 'a' and 'b' are two positive integers such that  $a^b \times b^a = 800$ . Find 'a' and 'b'
18. If  $3+k, 18-k, 5k+1$  are in A.P. then find k
19. Find the square root of the following expression.  $144 a^9 b^{12} c^{16} + 81 f^{12} g^4 h^{14}$
20. Find the sum and product of the roots of the following quadratic equation :  $Kx^2 - k^2x - 2k^3 = 0$
21. A man goes 18m due east and then 24m due north. Find the distance of his current position from the starting point.
22. Find the area of a triangle formed by the points (5, 2), (3, -5) and (-5, -1)
23. Calculate the slope and y intercept of the straight line  $8x - 7y + 6 = 0$
24. Prove that  $\sec \theta - \cos \theta = \tan \theta \sin \theta$
25. If the base area of a hemispherical solid is 1386 sq. meters, then its total surface area?
26. If the range and the smallest value of a set of data are 36.8 and 13.4 respectively, then find the largest value.
27. A die is rolled and a coin is tossed simultaneously. Find the probability that the die shows an odd number and coin shows a head.
28. From the top of a rock  $50\sqrt{3}m$  high, the angle of depression of a car on the ground is observed to  $30^\circ$ . Find the distance of the car from the rock.

**PART - III**

**Answer any Ten Questions. Q.No. 42 is compulsory**

**10 x 5 = 50**

29. Find x if  $gff(x) = fgg(x)$ , given  $f(x) = 3x + 1$  and  $g(x) = x + 3$ .
30. Let  $f:A \rightarrow B$  be a function defined by  $f(x) = x / 2 - 1$ , where  $A = \{2,4,6,10,12\}$ ,  $B = \{0,1,2,4,5,9\}$ . Represent f by (i) set of ordered pairs (ii) a table (iii) An arrow diagram (iv) A graph

31. A mother divides Rs.207 into three parts such that the amount are in A.P. and gives it to here three children. The product of the two least amounts than the children had Rs.4623. Find the amount received by each chld.
32. Find the sum to 'n' terms of the series  $7 + 77 + 777 + \dots$
33. Find the GCD of  $6x^3 - 30x^2 + 60x - 48$  and  $3x^3 - 12x^2 + 21x - 18$
34. If  $A = \begin{bmatrix} 1 & 1 \\ -1 & 3 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & 2 \\ -4 & 2 \end{bmatrix}$   $C = \begin{bmatrix} -7 & 6 \\ 3 & 2 \end{bmatrix}$  verify that  $A(B+C) = AB + AC$ .
35. State and prove the Basic proportionality theorem.
36. Find the equation of the median and altitude of  $\Delta ABC$  through A where the vertices are  $A(6,2)$ ,  $B(-5,-1)$  and  $C(1,9)$ .
37. Two ships are sailing in the sea on either sides of a lighthouse. The angle of elevation of the top of the lighthouse as observed from the ships are  $30^\circ$  and  $45^\circ$  respectively. If the lighthouse is 200m high, find the distance between the two ships. ( $\sqrt{3} = 1.732$ )
38. A toy is in the shape of a cylinder surmounted by a hemisphere. The height of the toy is 25cm. Find the total surface area of the toy if its common diameter is 12cm.
39. An aluminium sphere of radius 12cm is melted to make a cylinder of radius 8cm. Find the height of the cylinder.
40. Find the co-efficient of variation of 24, 26, 33, 37, 29, 31
41. Two dice are rolled. Find the probability that the sum of outcomes is (i) equal to 4 (ii) greater than 10 (iii) less than 13.
42. If -4 is a root of the equation  $x^2 + px - 4 = 0$  and if the equation  $x^2 + px + q = 0$  has equal roots, find the values of p and q.

**PART - IV**

**Answer all the Questions.**

**2 x 8 = 16**

43. a) Construct a similar triangle to given triangle LMN with its sides equal to  $4/5$  of the corresponding sides of the triangle LMN. (Scale factor  $4/5 < 1$ ) (OR)
- b) Take a point which is 11cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point.
44. a) Graph the following linear function  $y = 1/2x$ . Identify the constant of variation and verify it with the graph. Also (i) Find y when x = 9 (ii) Find x when y = 7.5 (OR)
- b) Draw the graph of  $y = 2x^2$  and hence solve  $2x^2 - x - 6 = 0$ .