

FIRST REVISION EXAM - 2023

STD - X

TIME : 3.00 Hrs

MATHS

MARKS : 100

PART - I

I. Answer all the questions.

14 x 1 = 14

1. $A = \{a, b, p\}$, $B = \{2, 3\}$, $C = \{p, q, r, s\}$ then $n[(A \cup C) \times B]$ is

- a) 8 b) 20 c) 12 d) 16

2. If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then $f \circ g$ is

- a) $\frac{3}{2x^2}$ b) $\frac{2}{3x^2}$ c) $\frac{2}{9x^2}$ d) $\frac{1}{6x^2}$

3. 3, x, 6.75 are consecutive terms of a G.P then x is

- a) 2.25 b) 9.75 c) 4.5 d) 1.5

4. The value of $(1^3 + 2^3 + 3^3 + \dots + 15^3) - (1 + 2 + 3 + \dots + 15)$ is

- a) 14400 b) 14200 c) 14280 d) 14520

5. $\frac{x}{x^2 - 25} - \frac{8}{x^2 + 6x + 5}$ gives

- a) $\frac{x^2 - 7x + 40}{(x-5)(x+5)}$ b) $\frac{x^2 + 7x + 40}{(x-5)(x+5)(x+1)}$ c) $\frac{x^2 - 7x + 40}{(x^2 - 25)(x+1)}$ d) $\frac{x^2 + 10}{(x^2 - 25)(x+1)}$

6. Find the matrix x if $2x + \begin{pmatrix} 1 & 3 \\ 5 & 7 \end{pmatrix} = \begin{pmatrix} 5 & 7 \\ 9 & 5 \end{pmatrix}$

- a) $\begin{pmatrix} 2 & -2 \\ 2 & -1 \end{pmatrix}$ b) $\begin{pmatrix} 2 & 2 \\ 2 & -1 \end{pmatrix}$ c) $\begin{pmatrix} 1 & 2 \\ 2 & 2 \end{pmatrix}$ d) $\begin{pmatrix} 2 & 1 \\ 2 & 2 \end{pmatrix}$

7. If in $\triangle ABC$ $DE \parallel BC$, $AB = 3.6$ cm, $AC = 2.4$ cm and $AD = 2.1$ cm then the length of AE is

- a) 1.4 cm b) 1.8 cm c) 1.2 cm d) 1.05 cm

8. A tangent is perpendicular to the radius at the

- a) Centre b) point of contact c) infinity d) chord

9. If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then slope of the perpendicular bisector of PQ is

- a) $\sqrt{3}$ b) $-\sqrt{3}$ c) $\frac{1}{\sqrt{3}}$ d) 0

10. The condition of two straight lines $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ where the co-efficients are non-zero, are perpendicular if and only if
 a) $a_1b_2 - a_2b_1 = 0$ b) $a_1b_2 + a_2b_1 = 0$ c) $a_1a_2 + b_1b_2 = 0$ d) $a_1a_2 - b_1b_2 = 0$
11. $\tan \theta \operatorname{Cosec}^2 \theta - \tan \theta$ is equal to
 a) $\sec \theta$ b) $\cot^2 \theta$ c) $\sin \theta$ d) $\cot \theta$
12. A spherical ball of radius r_1 units is melted to make 8 new identical balls each of radius r_2 units. Then $r_1 : r_2$ is
 a) 2 : 1 b) 1 : 2 c) 4 : 1 d) 1 : 4
13. Father of Indian statistics was.....
 a) Srinivasha Ramanujam b) Sagundala Devi
 c) Prasanta chandra Mahalanobis d) Kaprekar
14. Which of the following is incorrect >
 a) $p(A) > 1$ b) $0 \leq p(A) \leq 1$ c) $p(\phi) = 0$ d) $p(A) + p(\bar{A}) = 1$

PART - II

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

10 x 2 = 20

15. Let $A = \{ 1, 2, 3 \}$ and $B = \{ x/x \text{ is a prime number less than } 10 \}$. Find $A \times B$ and $B \times A$.
16. Find k , if $f \circ f(k) = 5$, where $f(k) = 2k - 1$
17. Today is Tuesday, My uncle will come after 45 days. In which day my uncle will be coming?
18. Find the number of terms in the A.P. 3, 6, 9, 12 111
19. Simplify : $\frac{x^3}{x-y} + \frac{y^3}{y-x}$
20. Determine the nature of roots for the quadratic equation $9x^2 - 24x + 16 = 0$.
21. If ΔABC is similar to ΔDEF such that $BC = 3$ cm $EF = 4$ cm and area of $\Delta ABC = 54$ cm². Find the area of ΔDEF .
22. In two concentric circles, a chord of length 16cm of larger circle becomes a tangent to the smaller circle whose radius is 6 cm. Find the radius of the larger circle.
23. The line through the points $(-2, a)$ and $(a, 3)$ has slope $-1/2$. Find the value of a .
24. Find the equation of a line whose intercepts on the x and y axes are $-5, 3/4$.
25. Prove that $\frac{\sec \theta}{\sin \theta} - \frac{\sin \theta}{\cos \theta} = \cot \theta$.
26. A solid sphere and a solid hemisphere have equal total surface area. Prove that the ratio of their volume is $3\sqrt{3} : 4$.
27. What is the probability that a leapear selected at random will contain 53 saturdays.

28. The mean and Variance of the 10th standard students of a school is 155cm and 72.25 cm² respectively. Find the co-efficient of variation.

PART - III

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

10 x 5 = 50

29. If $A = \{x \in \mathbb{N} / x < 2\}$, $B = \{x \in \mathbb{N} / 1 < x \leq 4\}$ and $C = \{3, 15\}$ then verify $A \cap (B \cap C) = (A \cap B) \cap (A \cap C)$.

30. If the function $f : \mathbb{R} \rightarrow \mathbb{R}$ is defined by $f(x) = \begin{cases} 2x+7; x < -2 \\ x^2-2; -2 \leq x < 3 \\ 3x-2; x \geq 3 \end{cases}$ then find the value of

(i) $f(4)$ (ii) $f(-2)$ (iii) $f(4) + 2f(1)$ (iv) $\frac{f(1)-3f(4)}{f(-3)}$

31. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.
32. If a, b, c are three consecutive terms of an A.P and x, y, z are three consecutive terms of a G.P. then P.T. $x^{b-c} x y^{c-a} x z^{a-b} = 1$.
33. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square. Find the values of a and b .
34. If α, β are the roots of $7x^2 + ax + 2 = 0$ and if $\beta - \alpha = -13/7$. Find the values of 'a'.
35. P and Q are the mid-points of the sides CA and CB respectively of a ΔABC , right angled at C. Prove that $4(AQ^2 + BP^2) = 5AB^2$.
36. Find the value of k , if the area of a quadrilateral is 28 sq. units, whose vertices are $(-4, -2), (-3, k), (3, -2)$ and $(2, 3)$.
37. Find the equation of a line passing through the point of intersection of the lines $4x + 7y - 3 = 0$ and $2x - 3y + 1 = 0$ that has equal intercepts on the axes.
38. A building and statue are in opposite side of a street from each other 35m apart. From a point on the roof of building the angle of elevation of the top of statue is 24° and the angle of depression of base of the statue is 34° . Find the height of the statue. ($\tan 24^\circ = 0.4452$, $\tan 34^\circ = 0.6745$).
39. If the radius of the circular ends of a frustum which is 45cm high are 28cm and 7cm, find the volume of the frustum.
40. A capsule is in the shape of a cylinder with two hemisphere stuck to each of its ends. if the length of the entire capsule is 12mm and the diameter of the capsule is 3mm, how much medicine it can hold?
41. Two dice are rolled once, Find the probability of getting an even number on the first die or a total of face sum 8.

42. If $A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$ show that $(AB)^T = B^T A^T$.

PART - IV

Answer all the Questions.

2 x 8 = 16

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{4}$ of the corresponding sides of the triangle PQR (Scale factor $\frac{7}{4} > 1$)

(OR)

- b) Construct a Δ PQR such that $QR = 6.5$ cm, $\angle P = 60^\circ$ and the altitude from P to QR is of length 4.5cm.

44. a) A bus is travelling at a uniform speed of 50 km/hr. Draw the distance - time graph and hence find

- (i) the constant of variation
- (ii) how far will it travel in 90 minutes
- (iii) the time required to cover a distance of 300 km from the graph.

(OR)

- b) Draw the graph of $y = 2x^2 - 3x - 5$ and hence solve $2x^2 - 4x - 6 = 0$