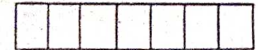


FTJ

QUARTERLY EXAMINATION- 2023

CLASS :10

MATHEMATICS



TIME : 3.00 hrs

MARKS : 100

PART - I

I Note : i) Answer all the questions. ii) Choose the most appropriate answer from the given four alternatives and write the option code on the corresponding answer. 14 X 1 = 14

- If $\{(a,8), (6, b)\}$ represents an identify function then the value of a and b are respectively
 a) (8, 6) b) (8, 8) c) (6, 8) d) (6, 6)
- If $f(x) = 2x^2$ and $g(x) = \frac{1}{3}$ then fog is.
 a) $\frac{3}{2x^2}$ b) $\frac{2}{3x^2}$ c) $\frac{2}{9x^2}$ d) $\frac{1}{6x^2}$
- The HCF of numbers of the form 2^m and 3^n is
 a) 1 b) 2 c) 3 d) 2^m and 3^n
- If a,b,care in G.P then 2a, 2b, 2c are in
 a) Arithmetic progression b) Geometric progression
 c) Arithmetic progression an Geometric progression
 d) None of these
- The values of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are
 a) 100, 120 b) 10, 12 c) -120, 100 d) 12, 10
- If $3\sqrt{x} = 9$ then the value of x is
 a) 3 b) 9 c) 18 d) 27
- If $\triangle ABC$ 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
- A tangent is perpendicular to the radius at the
 a) Centre b) Point of contract c) infinity d) chord
- The straight line given by the equation $x = 11$ is
 a) parallel to x axis b) parallel to y axis
 c) passing through the orgin d) passing through the point (0,11)

23. Find the square root of $\frac{144a^8 b^{12} c^{16}}{81f^{12} g^4 h^{14}}$.
24. If α and β are the roots of $x^2 + 7x + 10 = 0$ find the value of $\alpha^2 + \beta^2$.
25. If ΔABC is similar to ΔDEF such that $BC = 3\text{cm}$, $EF = 4\text{cm}$ and area of $\Delta ABC = 54\text{cm}^2$ find the area of ΔDEF .
26. Prove that $\sqrt{\frac{1 + \cos \theta}{1 - \cos \theta}} = \operatorname{cosec} \theta + \cot \theta$
27. Find the area of the triangle whose vertices are $(-3, 2)$, $(-1, 1)$ and $(1, 2)$.
28. Find the rational form of the number $0.6666 \dots$.

PART - III

Note: Answer any 10 questions.

Question No.42 is compulsory.

10 X 5 = 50

29. Let $A = \{x \in \mathbb{W} / x < 3\}$, $B = \{x \in \mathbb{N} / 1 < x \leq 5\}$ and $C = \{2, 5\}$ verify that $A \times (B \cup C) = (A \times B) \cup (A \times C)$
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 values of i) $f(4)$ ii) $f(-2)$ iii) $f(4) + 2f(1)$ iv) $\frac{f(1) - 3f(4)}{f(-3)}$.
31. Find the HCF of 396, 504 and 636.
32. In an A.P the sum of first n terms is $\frac{5n^2}{2} + \frac{3n}{2}$. Find the 17th term.
33. In a G.P the 9th term 32805 and 6th term is 1215. Find the 12th term.
34. Discuss the nature of solutions of the following system of equation.
 $x + 2y - z = 5$; $x - y + z = -2$, $-5x - 4y + z = -11$
35. Find the square root of $x^4 - 12x^3 + 42x^2 - 36x + 9$.
36. State and prove the Thales theorem.

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37. Find the area of the quadrilateral formed by the points (8, 6), (5, 11) (-5,12) and (-4, 3)
38. Without using Pythagoras theorem show that the points (1,-4), (2, -3) and (4, -7) form a right angled triangle.
39. A (-3,0) B (10,-2) and C (12, 3) are the vertices of $\triangle ABC$. Find the equation of the altitude through A and B.
40. If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$. Prove that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$.
41. If $f(x) = x - 1$, $g(x) = 3x + 1$ and $h(x) = x^2$ show that $(f \circ g) \circ h = f \circ (g \circ h)$.
42. If the roots of the equation $(c^2 - ab)x^2 - 2(a^2 - bc)x + b^2 - ac = 0$ are real and equal. Prove that either $a=0$ (or) $a^3 + b^3 + c^3 = 3abc$.

PART - IV

Note : Answer all the questions.

2 X 8 = 16

43. a) Construct a triangle similar to a given triangle ABC with its sides of the triangle ABC (Scale factor $\frac{6}{5} > 1$)
- (OR)**
- b) Draw a triangle ABC of base BC = 8 cm, $\angle A = 60^\circ$ and the bisector of $\angle A$ meets BC at D such that BD = 6cm.
44. a) Draw the graph of $xy = 24$, $x, y > 0$. Using the graph find (i) y when x=3 and (ii) x when y = 6.

(OR)

b) Varshika draw 6 circles with different sizes. Draw a graph for the relationship between the diameter and circumference (approximately related) of each circle as shown in the table and use it to find the circumference of a circle when its diameter is 6 cm.

Diameter (x) cm	1	2	3	4	5
Circumference (y) cm	3.1	6.2	9.3	12.4	15.5