

COMMON QUARTERLY EXAMINATION - 2025

Standard X

Reg.No.

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MATHEMATICS

Time : 3.00 hrs

Part – I

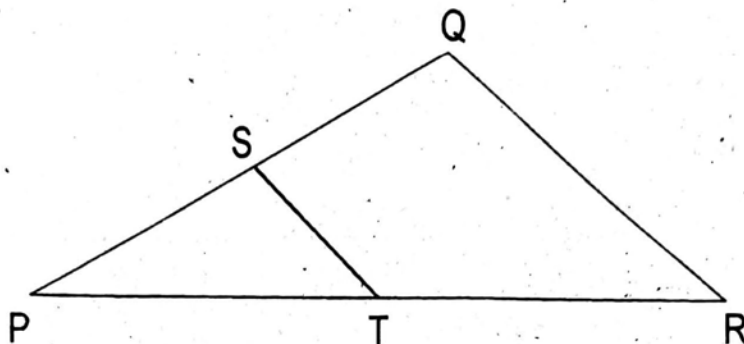
Marks : 100

I. Choose the correct answer:

14 x 1 = 14

1. If $n(A \times B) = 6$ and $A = \{1, 3\}$ then $n(B)$ is
 a) 1 b) 2 c) 3 d) 6
2. The range of the relation $R = \{(x, x^2) / x \text{ is a prime number less than } 13\}$ is
 a) $\{2, 3, 5, 7\}$ b) $\{2, 3, 5, 7, 11\}$ c) $\{4, 9, 25, 49, 121\}$ d) $\{1, 4, 9, 25, 49, 121\}$
3. If $f: A \rightarrow B$ is a bijective function and if $n(B) = 7$, then $n(A)$ is equal to
 a) 7 b) 49 c) 1 d) 14
4. Euclid's division lemma states that for positive integers a and b , there exist unique integers q and r such that $a = bq + r$, where r must satisfy.
 a) $1 < r < b$ b) $0 < r < b$ c) $0 \leq r < b$ d) $0 < r \leq b$
5. If 6 times of 6th term of an A.P. is equal to 7 times the 7th term, then the 13th term of the A.P. is
 a) 0 b) 6 c) 7 d) 13
6. If the sequence $t_1, t_2, t_3, \dots$ are in A.P. then the sequence $t_6, t_{12}, t_{18}, \dots$ is
 a) a Geometric Progression b) an Arithmetic Progression
 c) neither an Arithmetic Progression nor a Geometric Progression
 d) a constant sequence
7. If $(x - 6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is
 a) 3 b) 5 c) 6 d) 8
8. 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
9. In $\triangle LMN$, $\angle L = 60^\circ$, $\angle M = 50^\circ$. If $\triangle LMN \sim \triangle PQR$ then the value of $\angle R$ is
 a) 40° b) 70° c) 30° d) 110°

10. In a given figure $ST \parallel QR$, $PS = 2$ cm and $SQ = 3$ cm. Then the ratio of the area of ΔPQR to the area of ΔPST is



- a) 25 : 4 b) 25 : 7 c) 25 : 11 d) 25 : 13
11. If $(5,7)$, $(3,p)$ and $(6,6)$ are collinear, then the value of p is
 a) 3 b) 6 c) 9 d) 12
12. The slope of the line which is perpendicular to a line joining the points $(0,0)$ and $(-8, 8)$ is
 a) -1 b) 1 c) $1/3$ d) -8
13. $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to
 a) $\sec\theta$ b) $\cot^2\theta$ c) $\sin\theta$ d) $\cot\theta$
14. If f is the identity function, then the value of $f(1) - 2f(2) + f(3)$ is
 a) 1 b) 0 c) -1 d) -3

Part - II

II. Answer any 10 questions. (Q.No.28 is compulsory)

10 x 2 = 20

15. Find $A \times B$ and $B \times A$ if $A = \{2, -2, 3\}$ and $B = \{1, -4\}$.
16. Let $f = \{(x, y) \mid x, y \in \mathbb{N} \text{ and } y = 2x\}$ be a relation on $\mathbb{N}$. Find the domain, co-domain and range. Is this relation a function?
17. If $f(x) = 3x - 2$, $g(x) = 2x + k$ and if $f \circ g = g \circ f$, then find the value of k .
18. Find the number of terms in the A.P. 3, 6, 9, 12, ..., 111.
19. If $3 + k$, $18 - k$, $5k + 1$ are in A.P, then find k
20. Find the sum of $1 + 3 + 5 + \dots +$ to 40 terms.
21. Find the sum : $3 + 1 + \frac{1}{3} + \dots + \infty$

22. Find the sum and product of the roots for $x^2 + 3x - 28 = 0$
23. Determine the nature of the roots for $2x^2 - 2x + 9 = 0$
24. If the difference between a number and its reciprocal is $24/5$, find the number.
25. If $\triangle ABC$ is similar to $\triangle DEF$ such that $BC = 3$ cm, $EF = 4$ cm and area of $\triangle ABC = 54$ cm². Find the area of $\triangle DEF$.
26. Find the slope of a line joining the points $(14, 10)$ and $(14, -6)$
27. Prove that $\tan^2\theta - \sin^2\theta = \tan^2\theta \sin^2\theta$
28. Show that the given points are collinear: $(1, 2)$, $(2, 3)$ and $(3, 4)$

Part - III

III. Answer any 10 questions. (Q.No.42 is compulsory)

10x5=50

29. 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

30. If the function $f : \mathbb{R} \rightarrow \mathbb{R}$ is defined by

$$f(x) = \begin{cases} 2x+7 & ; \quad x < -2 \\ x^2-2 & ; \quad -2 \leq x < 3 \\ 3x-2 & ; \quad x \geq 3 \end{cases}, \text{ then find the values of}$$

- i) $f(4)$ ii) $f(-2)$ iii) $f(4) + 2f(1)$ iv) $[f(1) + 3f(4)] / f(-3)$

31. Find the HCF of 396, 504, 636.
32. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.
33. Find the sum to n terms of the series $3 + 33 + 333 + \dots$ to n terms.
34. Find the square root of $64x^4 - 16x^3 + 17x^2 - 2x + 1$
35. Simplify. $\frac{1}{x^2-5x+6} + \frac{1}{x^2-3x+2} - \frac{1}{x^2-8x+15}$
36. Find the GCD of the following division algorithm.
 $2x^4 + 13x^3 + 27x^2 + 23x + 7, x^3 + 3x^2 + 3x + 1, x^2 + 2x + 1$
37. State and prove Thales theorem.

38. Find the area of the quadrilateral whose vertices are at $(-9,0)$, $(-8,6)$, $(-1,-2)$ and $(-6,-3)$
39. Without using Pythagoras theorem, show that the points $(1,-4)$, $(2,-3)$ and $(4,-7)$ form a right angled triangle.
40. Find the equation of a straight line passing through $(1,-4)$ and has intercepts which are in the ratio 2:5
41. Prove the following identity: $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} + \sqrt{\frac{1-\sin\theta}{1+\sin\theta}} = 2\sec\theta$
42. Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8, C = The set of even prime number. Verify that $(A \cap B) \times C = (A \times C) \cap (B \times C)$

Part - IV

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 $\frac{7}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{3} > 1$)

(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 = 6 cm.
44. a) Varshika drew six 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

(OR)

- b) Draw the graph of $xy = 24$, $x, y > 0$. Using the graph find
i) y when $x = 3$ and ii) x when $y = 6$
