

COMMON QUATERLY EXAMINATION 2023**X – STD – MATHEMATICS****Time: 3.00 Hrs****Maximum Marks: 100****PART – I (Marks: 14)****I. Choose the correct answer: $1 \times 14 = 14$**

- If the ordered pairs $(a + 2, 4)$ and $(5, 2a + b)$ are equal then (a, b) is
(A) $(2, -2)$ (B) $(5, 1)$ (C) $(2, 3)$ (D) $(3, -2)$
- 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
- $f(x) = (x + 1)^3 - (x - 1)^3$ represents a function which is
(A) Linear (B) cubic (C) reciprocal (D) quadratic
- Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are
(A) 0, 1, 8 (B) 1, 4, 8 (C) 0, 1, 3 (D) 1, 3, 5
- Given $F_1 = 1$, $F_2 = 3$, and $F_n = F_{n-1} + F_{n-2}$ then F_5 is
(A) 3 (B) 5 (C) 8 (D) 11
- A system of three linear equations in three variables is inconsistent if their planes
(A) intersect only at a point (B) intersect in a line
(C) coincides with each other (D) do not intersect
- $y^2 + \frac{1}{y^2}$ is not equal to
(A) $\frac{y^4 + 1}{y^2}$ (B) $\left(y + \frac{1}{y}\right)^2$ (C) $\left(y - \frac{1}{y}\right)^2 + 2$ (D) $\left(y + \frac{1}{y}\right)^2 - 2$
- 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) $-8x^2$
- All the squares are _____
(A) shaped (B) omnipresence (C) parallel (D) none of these
- If in ΔABC , $DE \parallel BC$. $AB = 3.6$ 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
- The area of triangle formed by the points $(-5, 0)$, $(0, -5)$ and $(5, 0)$ is

(A) 0 sq. Units (B) 25 sq. Units (C) 5 sq. Units (D) none of these

12. What is inclination of a line whose slope is 1?

(A) 0° (B) 30° (C) 45° (D) 60°

13. If (5, 7), (3, p) and (6, 6) are collinear, then the value of p is

(A) 3 (B) 6 (C) 9 (D) 12

14. A tangent is perpendicular to the radius at the

(A) centre (B) point of contact (C) infinity (D) chord

PART – II (Marks: 20)

II. Answer 10 Questions. Question No. 28 is compulsory. $10 \times 2 = 20$

15. If $A \times B = \{(3,2), (3,4), (5,2), (5,4)\}$ then find A and B. (Eg.1.2)

16. Let $A = \{1, 2, 3, \dots, 45\}$ and R be the relation defined as “is square of” on A, write R as a subset of $A \times A$. Also, find the domain and range of R. (Ex.1.2-2)

17. Solve $5x \equiv 4 \pmod{6}$ (Ex.2.3-3)

18. If $1 + 2 + 3 + \dots + n = 666$ then find n. (Eg.2.58)

19. Which term of an A.P. 16, 11, 6, 1, is -54 (Ex.2.5-5)

20. Simplify : $\frac{x^2-16}{x^2+8x+1}$ (Ex.3.5 Model)

21. Determine the quadratic equations, whose sum and product of roots are $-\frac{3}{2}$ and -1 (Ex.3.9-1(iii))

22. Solve $2x - 3y = 6$, $x + y = 1$ (Eg.3.2)

23. 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 . (Eg.4.8)

24. What is the slope of a line whose inclination is 30° ? (Eg.5.8)

25. Show that the given points are collinear: $(-3, -4)$, $(7, 2)$ and $(12, 5)$. (Ex.5.2-5)

26. Show that the straight lines $x - 2y + 3 = 0$ and $6x + 3y + 8 = 0$ are Perpendicular. (Eg.5.33)

27. Find the slope of the straight line $6x + 8y + 7 = 0$ (Eg.5.30)

28. Determine the nature of the roots for the following quadratic equations $15x^2 + 11x + 2 = 0$ (Ex.3.13-1(i))

PART – III (Marks: 50)

III. Answer 10 Questions. Question No. 42 is compulsory. $10 \times 5 = 50$

29. Given $A = \{1, 2, 3\}$, $B = \{2, 3, 5\}$, $C = \{3, 4\}$, check if (Eg.1.3 model)

$$A \times (B \cup C) = (A \times B) \cup (A \times C)$$

30. Let $A = \{1, 2, 3, 4\}$ and $B = \{2, 5, 8, 11, 14\}$ be two sets. Let $f: A \rightarrow B$ be a function given by $f(x) = 3x - 1$ represent this function (i) by arrow diagram (ii) in a table form (iii) as a set ordered pairs (iv) in a graphical form. **(Eg.1.11)**
31. Find the sum to n terms of the series $5 + 55 + 555 + \dots$ **(Eg.2.51)**
32. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm, ..., 24 cm. How much area can be decorated with these colour papers? **(Ex.2.9-6)**
33. Find the sum of all natural numbers between 300 and 600 which are divisible by 7. **(Eg.2.36)**
34. Find the square root of $9x^4 + 12x^3 + 28x^2 + 16x + 16$ **(Eg.3.22 model)**
35. Find the GCD of the polynomials $x^3 + x^2 - x + 2$ and $2x^3 - 5x^2 + 5x - 3$
36. State and prove Thales theorem. **(Th.4.1) (35. Eg.3.10)**
37. Find the area of the quadrilateral formed by the points $(8, 6)$, $(5, 11)$, $(-5, 12)$ and $(-4, 3)$. **(Eg.5.6)**
38. Find the equation of the median and altitude of ΔABC through A where the vertices are $A(6, 2)$, $B(-5, -1)$ and $C(1, 9)$. **(Ex.5.3-9)**
39. Show that the points $P(-1.5, 3)$, $Q(6, -2)$, $R(-3, 4)$ are collinear. **(Eg.5.2)**
40. If the points $A(2, 2)$, $B(-2, -3)$, $C(1, -3)$ and $D(x, y)$ form a parallelogram then find the value of x and y . **(Ex.5.2-11)**
41. Find the equation of a straight line through the point of intersection of the lines $8x + 3y = 18$, $4x + 5y = 9$ and bisecting the line segment joining the points $(5, -4)$ and $(-7, 6)$. **(Ex.5.4-12)**
42. In a geometric progression, the 4th and 7th terms are 54 and 1458 respectively. Find the geometric progression. **(Eg.2.43 model)**

PART – IV (Marks: 16)

IV. Answer both questions.

2×8=16

43. Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{3}{5}$ of the corresponding sides of the triangle PQR (scale factor $\frac{3}{5} < 1$) **(Eg. 4.10) (OR)**
Construct a ΔPQR which the base $PQ = 4.5$ cm, $\angle R = 35^\circ$ and the median from R to RG is 6 cm. **(Ex.4.2-11)**
44. 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. **(Eg. 3.48) (OR)** Draw the graph of $xy = 24$, $x, y > 0$. Using the graph find, (i) y when $x = 3$ and (ii) x when $y = 6$. **(Ex 3.15-2)**

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P.G – ASST IN MATHS



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