

MODEL QUARTERLY EXAMINATION 2023-2024
X – STD – MATHEMATICS

Time: 3.00 Hrs**Maximum Marks: 100**

Instructions: (1) check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

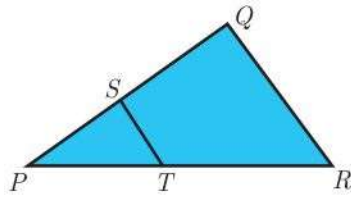
(2) Use **Blue or Black** ink to write and underline and pencil to draw diagrams

Note: this question paper contains **four** parts.

PART – I**(Marks: 14)****Note: (i) Answer all the 14 questions.****1 × 14 = 14**

(ii) Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer.

- If $n(A \times B) = 20$ and $n(A) = 5$ then $n(B)$ is ____ **(P.C-I) Pg-3**
(A) 4 (B) 2 (C) 1 (D) 3
- Let $f(x) = \sqrt{1+x^2}$ then **(Q.NO – I-13)**
(A) $f(xy) = f(x) \cdot f(y)$ (B) $f(xy) \geq f(x) \cdot f(y)$
(C) $f(xy) \leq f(x) \cdot f(y)$ (D) none of these
- If the HCF of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is **(Q.NO. II-3)** (A) 4 (B) 2 (C) 1
(D) 3
- The value of $(1^3 + 2^3 + 3^3 + \dots + 15^3) - (1 + 2 + 3 + \dots + 15)$ is **(Q.NO. II-15)**
(A) 14400 (B) 14200 (C) 14280 (D) 1452
- $y^2 + \frac{1}{y^2}$ is not equal to **(Q.NO. III-5)**
(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) $\left(y + \frac{1}{y}\right)^2 - 2$
- The solution of $(2x - 1)^2 = 9$ is equal to **(Q.NO.III- 9)**
(A) -1 (B) 2 (C) -1, 2 (D) none of these
- Graph of a linear equation is a **(Q.NO. III-12)**
(A) Straight line (B) circle (C) parabola (D) hyperbola
- If in triangles ABC and EDF, $\frac{AB}{DE} = \frac{BC}{FD}$ then they will be similar, when **(Q.NO. IV-1)**
(A) $\angle B = \angle E$ (B) $\angle A = \angle D$ (C) $\angle B = \angle D$ (D) $\angle A = \angle F$
- 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 **(Q.NO. IV-4)**



- (A) 25: 4 (B) 25: 7 (C) 25: 11 (D) 25: 13

10. Two non-vertical lines are **parallel** if and only if their **slopes** are ____ **pg 215-V**
 (A) not equal (B) equal (C) perpendicular (D) 0

11. If $b > 0$, then the line $y = b$ lies above the _____ **pg 221 -V**
 (A) y axis (B) origin (C) x axis (D) none of these

12. The straight line given by the equation $x = 11$ is **(Q.NO. 3)-V**

- (A) Parallel to X axis (B) parallel to Y axis
 (C) Passing through the origin (D) passing through the point (0,11)

13. If $(\sin \alpha + \operatorname{cosec} \alpha)^2 + (\cos \alpha + \sec \alpha)^2 = k + \tan^2 \alpha + \cot^2 \alpha$, then the value of k is equal to **(Q.NO. 3)-VI**

- (A) 9 (B) 7 (C) 5 (D) 3

14. The number of trigonometric ratio is _____ **pg 249 -VI**

- (A) 9 (B) 7 (C) 5 (D) 6

PART – II (Marks: 20)

II. Answer 10 Questions. Question No. 28 is compulsory.

10×2=20

15. Let $A = \{1, 2, 3\}$ and $B = \{x | x \text{ is a prime number less than } 10\}$. Find $A \times B$ and $B \times A$. **(Ex.1.1-2)**

16. Let $f(x) = 2x + 5$. if $x \neq 0$ then find $\frac{f(x+2)-f(2)}{x}$ **(Ex.1.3- 5)**

17. 'a' and 'b' are two positive integers such that $a^b \times b^a = 800$. Find 'a' and 'b'. **(Eg. 2.10)**

18. If a, b, c is in A.P. then show that $3^a, 3^b, 3^c$ are in G.P. **(Ex.2.7-8)**

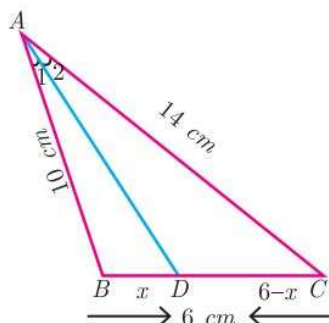
19. Find the 8th term of the G.P. 9, 3, 1, ... **(Eg. 2.42)**

20. Find the excluded values, if any of the following expressions. $\frac{x^3-27}{x^3+x^2-6x}$ **(Ex. 3.4- 2(iv))**

21. The product of Kumaran's age (in years) two years ago and his age four years from now is one more than twice his present age. What is his present age? **(Eg. 3.36)**

22. 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)**

23. In the Fig., AD is the bisector of $\angle BAC$, if $AB = 10$ cm, $AC = 14$ cm and $BC = 6$ cm. Find BD and DC. (Eg. 4.16)



24. The line r passes through the points $(-2, 2)$ and $(5, 8)$ and the line s passes through the points $(-8, 7)$ and $(-2, 0)$. Is the line r perpendicular to s ? (Eg. 5.10)

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

26. If the straight lines $12y = -(p + 3)x + 12$, $12x - 7y = 16$ are perpendicular then find 'p'. (Ex. 5.4 - 4)

27. Prove that $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \operatorname{cosec}\theta + \cot\theta$ (Eg. 6.5)

28. Prove the following identities. (i) $\frac{\cos\theta}{1+\sin\theta} = \sec\theta - \tan\theta$ (Ex. 6.1- 2(i))

PART – III (Marks: 50)

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

29. Let $A = \{x \in \mathbb{W} | x < 2\}$, $B = \{x \in \mathbb{N} | 1 < x \leq 4\}$ and $C = \{3, 5\}$ verify that (any one)

(i) $A \times (B \cup C) = (A \times B) \cup (A \times C)$ (ii) $A \times (B \cap C) = (A \times B) \cap (A \times C)$

(iii) $(A \cup B) \times C = (A \times C) \cup (B \times C)$ (Ex. 1.1- 6)

30. Consider the functions $f(x)$, $g(x)$ and $h(x)$ as given below. Show that $(f \circ g) \circ h = f \circ (g \circ h)$ in each case (any one) (Ex. 1.5-8)

(i) $f(x) = x - 1$, $g(x) = 3x + 1$, and $h(x) = x^2$

(ii) $f(x) = x^2$, $g(x) = 2x$ and $h(x) = x + 4$

(iii) $f(x) = x - 4$, $g(x) = x^2$ and $h(x) = 3x - 5$

31. Find the first five terms of the following sequence (Eg. 2.22)

$$a_1 = 1, a_2 = 1, a_n = \frac{a_{n-1}}{a_{n-2} + 3}; n \geq 3, n \in \mathbb{N}$$

32. Find the sum of all natural numbers between 602 and 902 which are not divisible by 4. (Ex. 2.6-7)

33. 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)

34. If $x = \frac{a^2+3a-4}{3a^2-3}$ and $\frac{a^2+2a-8}{2a^2-2a-4}$ find the value of x^2y^{-2} (Ex. 3.5- 4)

35. 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) $a^3 + b^3 + c^3 = 3abc$. (Ex.3.13-5)

36. If α, β are the roots of $7x^2 + ax + 2 = 0$ and if $\beta - \alpha = -\frac{13}{7}$ Find the values of a. (Ex. 3.14-4)

37. State and prove Angle Bisector Theorem (u-4)

38. Find the area of the quadrilateral whose vertices are at (Ex. 5.1-5(i))
(-9, -2), (-8, -4), (2,2) and (1, -3)

39. Find the equation of a straight line joining the point of intersection of $3x + y + 2 = 0$ and $x - 2y - 4 = 0$ to the point of intersection of $7x - 3y = -12$ and $2y = x + 3$ (Ex. 5.4-11)

40. If $\frac{\cos^2\theta}{\sin\theta} = p$ and $\frac{\sin^2\theta}{\cos\theta} = q$, prove $p^2q^2(p^2 + q^2 + 3) = 1$ (Eg.6.17)

41. If $\frac{\cos\theta}{1+\sin\theta} = \frac{1}{a}$ then prove that $\frac{a^2-1}{a^2+1} = \sin\theta$ (Ex. 6.1- 10)

42. Find the sum to n terms of the series $7 + 77 + 777 + \dots$ (Ex. 2.8-4 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 $\frac{7}{3}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{3}$) (Ex. 4.1- 13) (OR)

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 (Eg. 4.19)

44. Draw the graph of $y = x^2 + 4x + 3$ and hence find the roots of $x^2 + x + 1 = 0$ (Eg. 3.53) (OR)

Draw the graph of $y = (x - 1)(x + 3)$ and hence solve $x^2 - x - 6 = 0$ (Ex. 3.16-8)

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P.G – ASST IN MATHS



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