REGISTER NUMBER : | | | | | | |

X STD – MATHEMATICS

Time Allowed : 3 hours **Maximum Marks : 100**

PART – I

Note : (i). Answer all the questions. $14 \times 1 = 14$

(ii). Choose the most appropriate answer form the given four alternatives and write the option code and the corresponding answer.

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. Let A = { 1 , 2 , 3 , 4 } and B = { 4 , 8 , 9 , 10 }. A function $f: A \to B$ given by $f = \{(1, 4), (2, 8), (3, 9), (4, 10)\}$ is a

(A). Many – one function (B).Identity function (C). One to one function (D). Into function

3. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is…….

(A). 2025 (B). 5220 (C). 5025 (D). 2520

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

(A).14400 (B).14200 (C).14280 (D).14520

5. The sequence $-3, -3, -3, -3, \ldots\ldots\ldots\ldots\ldots$ is ……..

(A). an A.P only (B). a G.P only (C). neither A.P nor G.P (D). both A.P and G.P

6. $\frac{x}{x^2 - 25} - \frac{8}{x^2 + 6x + 5}$ 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). $\frac{x^2 + 10}{(x^2 - 25)(x + 1)}$

7. Graph of a linear polynomial is a ……..

(A). straight line (B). circle (C). Parabola (D). hyperbola

8. If the discriminant of $3x^2 - 14x + k = 0$ is 100 , then $k =$ ……

(A).8 (B). 32 (C). 16 (D). 24

9. 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

10. In ΔLMN , $\angle L = 60°$, $\angle M = 50°$. If $\Delta LMN \sim \Delta PQR$, then the value of $\angle R$ is……..

(A). $40°$ (B). $70°$ (C). $30°$ (D). $110°$

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 point of intersection of $3x - y = 4$ and $x + y = 8$ is .....

(A).(5 , 3) (B).(2 , 4) (C).(3 , 5) (D).(4 , 4)

13. The points $A\ (4\ ,4\ )$, $B\ (3,\ 5\ )$, $C\ (-1,-1)$ form a.....

(A). Right angle triangle (B). Isosceles triangle (C). Equilateral triangle (D). Collinear

14. $tan\theta\ cosec^2\theta - tan\theta$ is equal to .....

(A). $sec\theta$ (B). $cot^2\theta$ (C). $sin\theta$ (D). $cot\theta$

PART – II

Note : Answer any 10 questions. Question No.28 is compulsory. $\mathbf{10 \times 2 = 20}$

15. Let $A = \{1, 2, 3\}$ and $B = \{\ x$ is a prime number less than 10 $\}$. Find $A \times B$ and $B \times A$.

16. Let $A = \{1, 2, 3\ , 4\ \}$ and $B = N$. Let $f : A \to B$ be defined by $f(x) = x^3$, then

(i). Find the range of f. (ii). Identify the type of function.

17. If $13824 = 2^a \times 3^b$, then find a and b.

18. Find the number of terms in the A.P. 3 , 6 , 9 , 12 , ..., 111.

19. Compute x , such that $10^4 \equiv x\ (mod\ 19)$.

20. Simplify : $\frac{x^3}{x - y} + \frac{y^3}{y - x}$

21. Find the zeros of the quadratic expression : $x^2 + 8x + 12$

22. Find the sum and product of the roots of the equation : $8x^2 - 25 = 0$

23. If Δ ABC ~ Δ DEF such that area of Δ ABC is 9 cm^2 and the area of Δ DEF is 16 cm^2 and BC = 2.1 cm. Find the length of EF.

24. In the given figure, AD is the bisector of ∠A. If BD = 4cm, DC = 3cm and AB = 6cm, find AC.

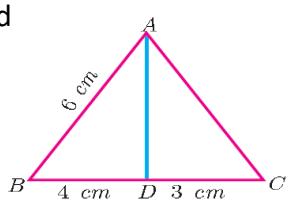

Fig. 4.39

25. If the area of the triangle formed by the vertices A (−1 , 2) , B (k ,−2) and C (7 , 4) (taken in order) is 22 sq.units, find the value of k.

26. Show that the given points are collinear. (−3,−4) , (7 , 2) and (12 , 5).

27. Prove that $\sqrt{\frac{1 + cos\theta}{1 - cos\theta}}$ = cosec θ + cot θ

28. Show that the straight lines $3x - 5y + 7 = 0$ and $15x + 9y + 4 = 0$ are perpendicular.

PART – III

Note : Answer any 10 questions. Question No.42 is compulsory. $\mathbf{10 \times 5 = 50}$

29. Let A = { $x \in$ W | x < 2} , B = { $x \in$ N | 1 < x ≤ 4 } and C = { 3 , 5 }. Verify that A × (B∩C) = (A×B) ∩ (A×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 of ordered pairs (iv). in a graphical form.

31. In a G.P , 9th term is 32805 and 6th term is 1215. Find the 12th term.

32. Rekha has 15 square colour papers of sizes 10cm, 11cm, 12cm,……, 24cm. How much area can be decorated with these colour papers?.

33. Find the HCF of 396 , 504 , 636.

34. Find the GCD of the polynomials $x^3 + x^2 - x + 2$, $2x^3 - 5x^2 + 5x - 3$

35. Find the square root of $64x^4 - 16x^3 + 17x^2 - 2x + 1$

36. Simplify : $\frac{a^2 - 16}{a^3 - 8} \times \frac{2a^2 - 3a - 2}{2a^2 + 9a + 4} \div \frac{3a^2 - 11a - 4}{a^2 - 2a + 4}$

37. State and prove Angle Bisector Theorem.

38. Two poles of height 'a' metres and 'b' metres are 'p' metres apart. Prove that the height of the point of intersection of the lines joining the top of each pole to the foot of the opposite pole is given by $\frac{ab}{a+b}$ metres.

39. Find the area of the quadrilateral whose vertices are at $(-9, -2)$, $(-8, -4)$, $(2, 2)$ and $(1, -3)$.

40. Find the equation of the perpendicular bisector of the line joining the points $A(-4, 2)$ and $B(6, -4)$.

41. If $\frac{\cos\alpha}{\cos\beta} = m$ and $\frac{\cos\alpha}{\sin\beta} = n$ then prove that $(m^2 + n^2)\cos^2\beta = n^2$.

42. Show that the given points form a parallelogram $A(-2, 0)$, $B(2, 4)$, $C(4, 1)$ and $D(0, -3)$ form a parallelogram.

PART – IV

Note : Answer the following questions. $2 \times 8 = 16$

43.(a). Construct a triangle similar to a given triangle LMN with its sides equal to $\frac{3}{5}$ of the corresponding sides of the triangle LMN. (Scale factor $\frac{3}{5} < 1$).

(OR)

(b). Draw a triangle ABC of base BC = 8 cm, ∠A = 60° and the bisector of ∠A meets BC at D such that BD = 6cm.

44.(a). Varshika drew 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

(OR)

(b). Draw the graph of $xy = 24$, x , $y > 0$. Using the graph find ,

(i) . y when $x = 3$ and (ii). x when $y = 6$