REGISTER NUMBER :

X STD – MATHEMATICS

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

PART – I

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

(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 $(1^3 + 2^3 + 3^3 + \cdots + 15^3) - (1 + 2 + 3 + \cdots \dots \dots + 15)$ is ………………….

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

5. The sequence $-3, -3, -3, -3, \dots \dots \dots \dots \dots ..$ 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 $f : A \rightarrow B$ 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.

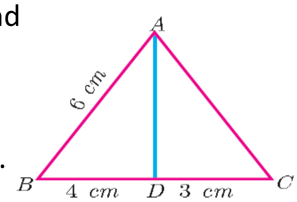

Fig. 4.39

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 col inear $(-3, -4)$, $(7, 2)$ 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 | $1 < x \leq 4$ } 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 $f: A \to B$ 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 , 9^{th} term is 32805 and 6^{th} term is 1215. Find the 12^{th} 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. $\mathbf{2 \times 8 = 16}$

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 $y = 6$