9 - STD	HALF YEARLY EXAMINATION – 2024	
TIME : 2.30 Hrs	MATHEMATICS	MARKS : 100

9122-A SM

PART – I (Marks - 14)

Note: i) **Answer All the 14 questions**
ii) **Choose the most suitable answer from given the four alternatives and write the option code with the corresponding answers.** 14 x 1 = 14

1. The set $P = \{x \mid x \in \mathbb{Z},\ -1 < x < 1\}$ is a
(A) Singleton set (B) Power set (C) Null set (D) Subset

2. If $n(A) = 10$ and $n(B) = 15$, then the minimum and maximum number of elements in $A \cap B$ is
(A) 10, 15 (B) 15, 10 (C) 10, 0 (D) 0, 10

3. If $B - A$ is B then $A \cap B$ is _____
(A) A (B) B (C) U (D) ϕ

4. Which one of the following has a terminating decimal expansion?.
(A) $\frac{5}{64}$ (B) $\frac{8}{9}$ (C) $\frac{14}{15}$ (D) $\frac{1}{12}$

5. If $\sqrt{9^x} = \sqrt[3]{9^2}$ then $x =$ _____
(A) $\frac{2}{3}$ (B) $\frac{4}{3}$ (C) $\frac{1}{3}$ (D) $\frac{5}{3}$

6. Zero of $(2-3x)$ is _____
(A) 3 (B) 2 (C) $\frac{2}{3}$ (D) $\frac{3}{2}$

7. Degree of the constant polynomial is _____
(A) 3 (B) 2 (C) 1 (D) 0

8. Which of the following is a solution of the equation $2x - y = 6$
(A) $(2, 4)$ (B) $(4, 2)$ (C) $(3, -1)$ (D) $(0, 6)$

9. The interior angle made by the side in a parallelogram is 90° then the parallelogram is a
(A) rhombus (B) rhombus (C) trapezium (D) kite

10. If one angle of a cyclic quadrilateral is 55^0, then the opposite angle is
(A) 100^0 (B) 105^0 (C) 5^0 (D) 75^0

11. The point whose ordinate is 4 and which lies on the y-axis is _____
(A) $(4, 0)$ (B) $(0, 4)$ (C) $(1, 4)$ (D) $(4, 1)$

12. The ratio in which the x-axis divides the line segment joining the points $(6, 4)$ and $(1, -7)$ is
(A) 2 : 3 (B) 3 : 4 (C) 4 : 7 (D) 4 : 3

13. If $2\sin 2\theta = \sqrt{3}$, then the value of θ is
(A) 90^0 (B) 30^0 (C) 45^0 (D) 60^0

14. The value of $\tan 1^0 \tan 2^0 \tan 3^0 \ldots \tan 89^0$ is
(A) 0 (B) 1 (C) 2 (D) $\frac{\sqrt{3}}{2}$

PART – II (Marks - 20)

Note: Answer any 10 questions. Question Number 28 is compulsory: - **10 x 2 = 20**

15. [illegible]

16. If $A=\{6, 7, 8, 9\}$ and $B=\{8, 10, 12\}$, then find $A \Delta B$

17. Find the number of subsets and the number of proper subsets of a set $X=\{a,b,c,x,y,z\}$

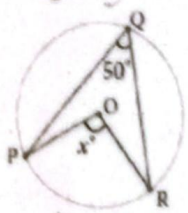
18. Convert the decimal number $0.\overline{24}$ in the form of $\frac{p}{q}$

19. Write the scientific notation of 72006865.48

20. If $p(x)=4x^2-3x+2x^3+5$ and $q(x)=x^2+2x+4$ find $p(x)+q(x)$

21. What is the remainder when $x^{2023}+2023$ is divided by $(x-1)$

22. Find the value of $x°$ in the figure



23. Find the length of a chord which is at a distance of $2\sqrt{11}$ cm from the centre of a circle of radius 12cm.

24. Find the distance between the points $(-4, 3), (2, -3)$

25. Find the centroid of the triangle whose verities are $(2, -4), (-3, 7)$ and $(7, 2)$

26. Evaluate:- $\sin^2 45^0+\cos^2 45^0$

27. If $Cosec\, A = Sec 34^0$ then, find the value of A

28. Find the value of $(243)^{\frac{2}{5}}$

PART – III (Marks - 50)

Note: Answer any 10 questions. Question Number. 42 is compulsory: - **10 x 5 = 50**

29. Verify $(A \cap B)' = A' \cup B'$, using Venn diagrams.

30. In a party of 45 people, each one likes tea or coffee or both. 35 people like tea and 20 people like coffee. Find the number of people who
    (i) like both tea and coffee.
    (ii) do not like tea.
    (iii) do not like coffee.

31. Simplify:- $2\sqrt[3]{40}+3\sqrt[3]{625}+4\sqrt[3]{520}$

35. Find the value of a and b, if $\begin{pmatrix} 11 & 5 \\ 7 & 3 \end{pmatrix} + a\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix} = b\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

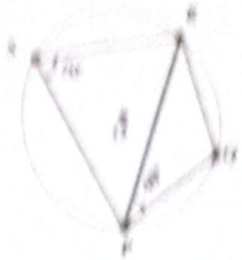
36. Represent $\sqrt{33}$ on the number line up to 4 decimal places.

37. Factorize the polynomials $x^3 - 10x^2 + x + 10$ using synthetic division.

38. Given $4x + 3y = 63$ and $x + 2y = 18$ solve by elimination method.

39. In a quadrilateral $ABCD$, $\angle A = 75^\circ$ and $\angle C$ is the supplementary of $\angle A$. The other two angles are $(2x - 10)^\circ$ and $(x + 4)^\circ$. Find the value of x and the measure of all the angles.

40. If $PQRS$ is a cyclic quadrilateral in which $\angle PQR = 70^\circ$ and $\angle QPR = 60^\circ$, then find $\angle PRS$.



41. Show that the points $A(-4, -3)$, $B(3, 1)$, $C(5, 6)$ and $D(-2, 2)$ taken in that order form the vertices of a parallelogram.

42. Find the length of median through A of a triangle whose vertices are $A(-1, 3)$, $B(1, -1)$ and $C(5, 1)$.

43. If $\tan A = \frac{2}{3}$, then find all the other trigonometric ratios.

44. Verify $\cos 3A = 4\cos^3 A - 3\cos A$, when $A = 30^\circ$.

45. $A = \{0, 2, 4, 6, 8\}$, $B = \{x : x \text{ is a prime number and } x < 11\}$ and $C = \{x : x \in \mathbb{N}, 5 \le x < 9\}$, then verify $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$.

PART - IV (Marks- 16)

Note: Answer ALL the questions: -

$2 \times 8 = 16$

46. **(A).** Construct the centroid of ΔPQR whose sides are $PQ = 8$ cm, $QR = 6$ cm and $RP = 7$ cm.

OR

(B). Construct the circumcentre of the ΔABC with $AB = 5$ cm, $\angle A = 60^\circ$ and $\angle B = 80^\circ$. Also draw the circumcircle and find the circumradius of the ΔABC.

47. **(A).** Use graphical method to solve the following system of equations: $x + y = 7$ and $x - y = 3$.

OR

(B). Draw the graph of $y = 3x - 1$.