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COMMON ANNUAL EXAMINATION - 2024

Std - IX

MATHS

Time : 3.00 Hours

Marks: 100

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

- The set $P = \{x | x \in \mathbb{Z}, -1 < x < 1\}$ is a
a) Singleton set b) power set c) Null set d) subset
- 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
- If $\frac{1}{7} = 0.\overline{142857}$ then the value of $\frac{5}{7}$ is
a) $0.\overline{142857}$ b) $0.\overline{714285}$ c) $0.\overline{571428}$ d) 0.714285
- $0.\overline{34} + 0.\overline{34}$
a) $0.\overline{687}$ b) $0.\overline{68}$ c) $0.\overline{68}$ d) $0.68\overline{7}$
- $(x+y)(x^2 - xy + y^2)$ is equal to
a) $x^3 + y^3$ b) $x^2 + y^2$ c) $x^2 - y^2$ d) $x^3 - y^3$
- If $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ where $a_1x + b_1y + c = 0$ and $a_2x + b_2y + c = 0$ then the given pair of linear equation has solution(s).
a) no solution b) two solutions c) unique d) infinite
- If the diagonal of a rhombus are equal, then the rhombus is a
a) Parallelogram but not a rectangle b) Rectangle but not a square
c) square d) parallelogram but not a square
- In a cyclic quadrilateral ABCD, if $\angle A = 4x$, $\angle C = 2x$ find the value of x .
a) 30° b) 20° c) 15° d) 25°
- In what ratio does the point Q (1,6) divide the line segment joining the points P(2,7) and R(-2, 3)
a) 1:2 b) 2:1 c) 1:3 d) 3:1
- The distance between the two points (2,3) and (1,4) is
a) 2 b) $\sqrt{56}$ c) $\sqrt{10}$ d) $\sqrt{2}$
- If $\tan \theta = \cot 37^\circ$, then the value of θ is
a) 37° b) 53° c) 90° d) 1°
- The capacity of a water tank of dimensions 10m x 5m x 1.5 m is
a) 75 litres b) 750 litres c) 7500 litres d) 75000 litres

13. For which set of numbers do the mean, median and mode all have the same values?
 a) 2, 2, 2, 4 b) 1, 3, 3, 3, 5 c) 1, 1, 2, 5, 6 d) 1, 1, 2, 1, 5
14. Which of the following cannot be taken as probability of an event?
 a) 0 b) 0.5 c) 1 d) 1.5

Answer any 10 questions. (Q.No. 28 compulsory)

10 x 2 = 20

15. If $A = \{1, 2, 3\}$, $B = \{2, 3, 5\}$, $C = \{3, 4\}$ and $D = \{1, 3, 5\}$ then find $A \cup B$, $D \cap C$, $A - B$ and $B - A$.
16. Represent $\sqrt{9}$ on a number line.
17. Express in scientific notation i) 9768854 ii) 0.04567891
18. Factorise: $t^2 + 72 - 17t$
19. Find GCD and LCM of the following i) $25ab^3c$, $100a^2bc$, $125ab$ ii) $a^3 - 9ax^2$, $(a-3x)^2$
20. Solve by the method of elimination : $8x - 3y = 5$ and $4x - 3y = 1$
21. A chord is 12 cm away from the centre of the circle of radius 15cm. Find the length of the chord.
22. The angles of a quadrilateral are in the ratio 2:4:5:7. Find all the angles.
23. The centre of a circle is $(-4, -1)$. If one end of the diameter of the circle is $(2, 7)$, then find radius of the circle.
24. Find the value of $\tan 30^\circ + \tan 60^\circ + \tan 45^\circ$
25. A cuboid has total surface area of $40m^2$ and its lateral surface area is $26m^2$. Find the area of its base.
26. In a distribution, the mean and mode are 66 and 60 respectively. Calculate the median.
27. When two coins are tossed, what is the probability that two heads are obtained?
28. In a class in mathematics, 10 students scored 75 marks, 12 students scored 60 marks, 8 students scored 40 marks and 3 students scored 30 marks. Find the mean of their score.

Part - III

Answer any 10 questions. Questions No. 42 is compulsory: Each question carries 5 marks

10 x 5 = 50

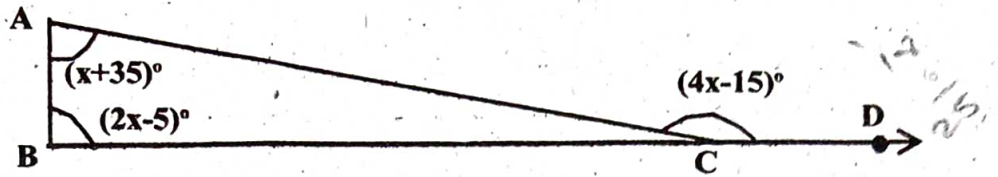
29. In a school, all students play either Hockey or Cricket or both. 300 play Hockey, 250 play Cricket and 110 play both games. Find i) The number of students who play only Hockey. ii) the number of students who play only Cricket. iii) the total number of students in the school.
30. If $A = \{x: x = 6n, n \in \mathbb{Z}, n < 6\}$, $B = \{x: x = 2n, n \in \mathbb{N}, 2 < n \leq 9\}$, $C = \{x: x = 3n, n \in \mathbb{N}, 4 < n \leq 10\}$ Verify that $A - (B \cap C) = (A - B) \cup (A - C)$
31. If $\sqrt{2} = 1.414$, $\sqrt{3} = 1.732$, $\sqrt{5} = 2.236$, $\sqrt{10} = 3.162$, then find the values of the following correct to 3 places of decimals, $\sqrt{300} + \sqrt{90} - \sqrt{8}$
32. Find the value of a and b if $\frac{\sqrt{7}-2}{\sqrt{7}+2} = a\sqrt{7} + b$.
33. The length of a rectangle is $(3x+2)$ units and it's breadth is $(3x-2)$ units. Find its area in terms of x. What will be the area if $x = 20$ units.

34. If $(x+a)(x+b)(x+c) = x^3 + 14x^2 + 59x + 70$ find the value of

i) $a + b + c$ ii) $\frac{1}{a} + \frac{1}{b} + \frac{1}{c}$ iii) $a^2 + b^2 + c^2$ iv) $\frac{a}{bc} + \frac{b}{ac} + \frac{c}{ab}$

35. Prove that in a parallelogram, opposite sides are equal.

36. Find all the three angles of the $\triangle ABC$.



37. Find the length of median through C of a triangle whose vertices are A(-4, 3), B(1, -1) and C(5, 1)

38. The side of a metallic cube is 12 cm. It is melted and formed into a cuboid whose length and breadth are 18cm and 16cm respectively. Find the height of the cuboid.

39. Three different triangular plots are available for sale in a locality. Each plot has a perimeter of 120m. The side lengths are also given:

Shape of plot	Perimeter	Length of sides
Right angled triangle	120 m	30m, 40m, 50m
Acute angled triangle	120m	35m, 40m, 45m
Equilateral triangle	120m	40m, 40m, 40m

Help the buyer to decide which among these will be more spacious.

40. Find the Arithmetic mean of the following data.

Age	15-19	20-24	25-29	30-34	35-39	40-44
No. of persons	4	20	38	24	10	9

41. Two dice are rolled, find the probability that the sum is i) equal to 1 ii) equal to 4 iii) less than 13

42. Find the area of a right triangle whose hypotenuse is 10 cm and one of the acute angle is $24^\circ 24'$.

Part - IV

Answer both questions. Each question carries 8 marks:

2 x 8 = 16

43. a) Use graphical method to solve the following system of equations.

$$x + y = 9, 2x - y = 6$$

(OR)

b) The perimeter of a rectangle is 36 metres and the length is 2 metres more than three times the width. Find the dimension of rectangle by using the method of graph.

44. a) Construct the $\triangle LMN$ such that $LM = 7.5\text{cm}$, $MN = 5\text{cm}$ and $LN = 8\text{cm}$, locate its circumcentre and draw the circumcircle. (OR)

b) Draw a triangle ABC, where $AB = 8\text{cm}$, $BC = 6\text{cm}$ and $\angle B = 70^\circ$ and Locate its centroid.