CLASS : 9

HALF YEARLY EXAMINATION-2022-23

Register Number

MATHEMATICS

Time Allowed : 3.00 Hours] PART – A [Max. Marks : 100

I Choose the correct Answer. **14x1=14**

1. If A = {x, y, z} then the number of non - empty subsets of A is
   (1) 8 (2) 5 (3) 6 (4) 7
2. For any three sets P, Q and R, P - (Q ∩ R) is
   (1) P - (Q ∪ R) (2) (P ∩ Q) - R (3) (P - Q) ∪ (P - R) (4) (P - Q) ∩ (P - R)
3. If $\frac{1}{7} = 0.\overline{142857}$ then the value of $\frac{5}{7}$ is
   (1) $0.\overline{142857}$ (2) $0.\overline{714285}$ (3) $0.\overline{571428}$ (4) 0.714285
4. If $\sqrt{9^x} = \sqrt[3]{9^2}$, then x = --------
   (1) $\frac{2}{3}$ (2) $\frac{4}{3}$ (3) $\frac{1}{3}$ (4) $\frac{5}{3}$
5. Degree of the polynomial $(y^3 - 2)(y^3 + 1)$ is
   (1) 9 (2) 2 (3) 3 (4) 6
6. Zeros of (2 - 3x) is -------
   (1) 3 (2) 2 (3) $\frac{2}{3}$ (4) $\frac{3}{2}$
7. Which of the following is a solution of the equation 2x - y = 6
   (1) (2, 4) (2) (4, 2) (3) (3, -1) (4) (0, 6)
8. GCD of any two prime numbers is
   (1) -1 (2) 0 (3) 1 (4) 2
9. If the diagonal of a rhombus are equal, then the rhombus is a
   (1) Parallelogram but not a rectangle (2) Rectangle but not a square
   (3) Square (4) Parallelogram but not a square
10. The angles of a triangle are 3x - 40, x + 20 and 2x - 10 then the value of x is
    (1) 40° (2) 35° (3) 50° (4) 45°
11. If one angle of a cyclic quadrilateral is 75°, then the opposite angle is
    (1) 100° (2) 105° (3) 85° (4) 90°
12. The points (-5, 2) and (2, -5) lie in the --------
    (1) Same quadrant (2) II and III quadrant respectively
    (3) II and IV quadrant respectively (4) IV and II quadrant respectively
13. The ratio in which the x-axis divides the linesegment joining the points (6, 4) and (1, -7) is
    (1) 2 : 3 (2) 3 : 4 (3) 4 : 7 (4) 4 : 3
14. The mid - point of the line joining (-a, 2b) and (-3a, -4b) is
    (1) (2a, 3b) (2) (-2a, -b) (3) (2a, b) (4) (-2a, -3b)

PART - B

Answer any 10 questions. Question No. 28 is compulsory. **10x2=20**

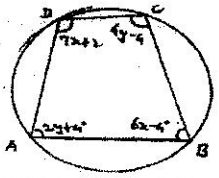
15. If n[P(A)] = 256, find n (A).
16. If A = {6, 7, 8, 9} and B = {8, 10, 12} find A Δ B
17. If n (A) = 300, n(A ∪ B) = 500, n (A ∩ B) = 50 and n (B^l) = 350°. find n (B) and n (U).
18. Without actual division, classify the decimal expansion of the following numbers as terminating or non -terminating and recurring. i) $\frac{43}{375}$ ii) $\frac{31}{400}$
19. Verify that $1 = 0.\overline{9}$

20. The mass of the Earth is 5.97×10^{24} kg and that of the Moon is 0.073×10^{24} kg. What is their total mass?
21. Show that $(x + 2)$ is the factor of $x^3 - 4x^2 - 2x + 20$
22. Solve by the method of elimination. $2x - y = 3$; $3x + y = 7$
23. Factorise : $m^2 + \frac{1}{m^2} - 23$
24. Find the GCD for the following $35x^5y^3z^4$, $49x^2yz^3$, $14xy^2z^2$
25. The angles of the quadrilateral are in the ratio 2 : 4 : 5 : 7. Find all the angles.
26. A chord is 12 cm away from the centre of the circle of radius 15 cm. Find the length of the chord.
27. If (x, 3), (6, y), (8, 2) and (9, 4) are the verticles of a parallelogram taken in order, then find the value of x and y.
28. If the centroid of a triangle is at (4, -2) and two of its vertices are (3, -2) and (5, 2) then find the third vertex of the triangle.

PART - C

Answer the following any 10 questions.Q.No.42 is compulsory. **10x5=50**

29. Verify $(A \cup B)' = A' \cap B'$ using Venn diagram.
30. A survey of 1000 farmers found that 600 grew paddy, 350 grew ragi, 280 grew corn, 120 grew paddy and ragi,100 grew ragi and corn, 80 grew paddy and corn. If each farmer grew atleast any one of the above three, then find the number of farmers who grew all the three.
31. Arrange in ascending order: $\sqrt[3]{2}$, $\sqrt[2]{4}$, $\sqrt[4]{3}$
32. Find the value of a and b if $\frac{\sqrt{7}-2}{\sqrt{7}+2} = a\sqrt{7} + b$
33. Find the area of square whose side length is $3m + 2n - 4l$
34. Factorise : $x^3 + x^2 - 14x - 24$
35. Solve by cross - multiplication method $6x + 7y - 11 = 0$; $5x + 2y = 13$
36. 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) $\frac{a}{bc} + \frac{b}{ac} + \frac{c}{ab}$
37. Prove that in a parallelogram, opposite sides are equal.
38. Find all the angles of the given cyclic quadrilateral ABCD in the figure.



39. Show that the points A $(\sqrt{3}, 2)$, B (0, 1) and C (0, 3) form an equilateral triangle.
40. The mid points of the sides of a triangle are (5, 1), (3, -5) and (-5, -1). Find the coordinates of the varticles of the triangle.
41. Find the coordinates of the points of trisection of the line segment joining the points A (-5, 6) and B (4, -3)
42. If $A = \{x / -3 \leq x < 4, x \in Z\}$, $B = \{x / x < 5, x \in N\}$, $C = \{-5, -3, -1, 0, 1, 3\}$, then verify $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$

PART - D

Answer all the questions. **2x8=16**

43. a) Construct the centroid of ΔPQR whose sides are PQ = 8 cm; QR = 6 cm; RP = 7 cm

OR

b) Draw ΔABC, Where AB = 6 cm; $\angle B = 110^\circ$ and BC = 5 cm and construst its orthocentre.

44. a) Draw a graph for $y = 4x - 1$

OR

b) Use graphical method, solve the system of equations $x - y = 0$; $y + 3 = 0$.