

## COMMON HALF YEARLY EXAMINATION - 2023

B

Standard IX

Reg.No. 

## MATHEMATICS

Time : 3.00 hrs

Part - I

Marks : 100

14 x 1 = 14

I. Choose the correct answer:

- If  $A \cup B = B \cap A$  then
  - $A \neq B$
  - $A = B$
  - $A \subset B$
  - $B \subset A$
- Let  $A = \{\phi\}$  and  $B = P(A)$  then  $A \cap B$  is
  - $\{\phi, \{\phi\}\}$
  - $\{\phi\}$
  - $\phi$
  - $\{0\}$
- $0.\overline{34} + 0.3\overline{4} =$ 
  - $0.6\overline{87}$
  - $0.\overline{68}$
  - $0.6\overline{8}$
  - $0.6\overline{87}$
- Which one of the following has a terminating decimal expansion?
  - $\frac{5}{64}$
  - $\frac{8}{9}$
  - $\frac{14}{15}$
  - $\frac{1}{12}$
- If  $x^{51} + 51$  is divided by  $x + 1$ , then the remainder is
  - 0
  - 1
  - 49
  - 50
- Degree of the constant polynomial is \_\_\_\_\_.
  - 3
  - 2
  - 1
  - 0
- Which of the following is a solution of the equation  $2x - y = 6$ 
  - (2,4)
  - (4,2)
  - (3,-1)
  - (0,6)
- The exterior angle of a triangle is equal to the sum of two
  - exterior angles
  - interior opposite angles
  - alternate angles
  - interior angles
- PQ and RS are two equal chords of a circle with Centre O such that  $\angle POQ = 70^\circ$ , then  $\angle ORS =$ 
  - $60^\circ$
  - $70^\circ$
  - $55^\circ$
  - $80^\circ$
- The distance between two points (2,3) and (1,4) is
  - 2
  - $\sqrt{56}$
  - $\sqrt{10}$
  - $\sqrt{2}$
- The mid-point of the line joining  $(-a, 2b)$  and  $(-3a, -4b)$  is
  - (2a,3b)
  - $(-2a, -b)$
  - (2a,b)
  - $(-2a, -3b)$
- If  $(x - 2, 4) = (5, y - 2)$ , then the co-ordinates (x,y) are
  - (7,6)
  - (7,12)
  - (6,3)
  - (3,6)
- Given that  $\sin \alpha = \frac{1}{2}$  and  $\cos \beta = \frac{1}{2}$  then the value of  $\alpha + \beta$  is
  - $0^\circ$
  - $90^\circ$
  - $30^\circ$
  - $60^\circ$
- If  $2\sin 2\theta = \sqrt{3}$ , then the value of  $\theta$  is
  - $90^\circ$
  - $30^\circ$
  - $45^\circ$
  - $60^\circ$

## Part - II

10 x 2 = 20

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

15. If  $U = \{0, 1, 2, 3, 4, 5, 6\}$ ,  $A = \{1, 3, 5\}$ ,  $B = \{0, 3, 4, 5\}$ , find  $(A \cup B)'$

16. Write down the power set of  $A = \{p, q, r, s\}$

17. Find any two rational numbers between  $\frac{1}{2}$  and  $\frac{2}{3}$

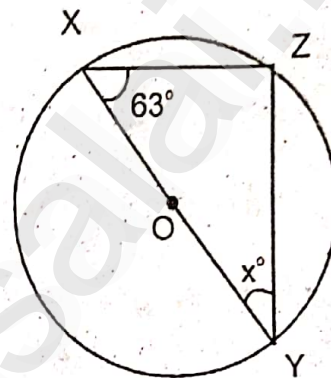
18. Find the value of  $\left(\frac{64}{125}\right)^{-2/3}$

19. Find the GCD of  $25ab^3c$ ,  $100a^2bc$ ,  $125ab$

20. Factorise :  $8x^3 + 125y^3$

21. What must be subtracted from  $2x^4 + 4x^2 - 3x + 7$  to get  $3x^3 - x^2 + 2x + 1$

22. The diameter of the circle is 52 cm and the length of one of its chord is 20 cm. Find the distance of the chord from the centre.



23. Find the value of  $x^\circ$  where  $\angle ZXY$  is  $63^\circ$

24. Find the coordinates of the point which divides the line segment joining the points  $A(4, -3)$  and  $B(9, 7)$  in the ratio 3 : 2

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

26. Verify the following equality :  $1 + \tan^2 30^\circ = \sec^2 30^\circ$

27. If  $2 \cos \theta = \sqrt{3}$ , then find  $\sin \theta$  and  $\tan \theta$ .

28. The area of a rectangle is  $x^2 + 7x + 12$ . If its breadth is  $(x+3)$ , then find its length.

## Part - III

III. Answer any 10 questions. (Q.No.42 is compulsory)

10 x 5 = 50

29. If  $A = \{1, 3, 5\}$ ,  $B = \{2, 3, 5, 6\}$ ,  $C = \{1, 5, 6, 7\}$ , then verify

$$n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(A \cap C) + n(A \cap B \cap C)$$

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

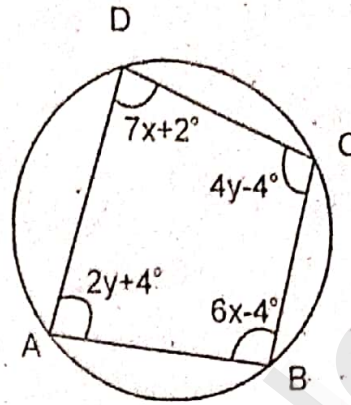
31. Simplify :  $2\sqrt[3]{40} + 3\sqrt[3]{625} - 4\sqrt[3]{320}$

32. Find the value of 'a' and 'b' if  $\frac{\sqrt{7}-2}{\sqrt{7}+2} = a\sqrt{7} + b$

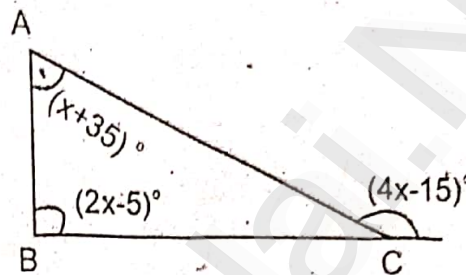
33. If the quotient on dividing  $x^4 + 10x^3 + 35x^2 + 50x + 29$  by  $(x+4)$  is  $x^3 - ax^2 + bx + 6$ , then find the value of 'a', 'b' and also the remainder.

34. Factorise by using synthetic division :  $x^3 - 7x + 6$

35. Find all the angles of the given cyclic quadrilateral ABCD.



36. Find all the angles of triangle ABC.



37. Show that the points A(7, 10), B(-2, 5), C(3, -4) are the vertices of a right angled triangle?

38. Find the co-ordinates of the points of trisection of the line segment joining the points A(-5, 6) and B(4, -3)

39. Find the angle made by a ladder of length 8 m with the ground, if one of its end is 4 m away from the wall and the other end is on the wall?

40. Find the value of :  $(\sin 90^\circ + \cos 60^\circ + \cos 45^\circ) \times (\sin 30^\circ + \cos 0^\circ - \cos 45^\circ)$

41. If  $\sec \theta = \frac{13}{5}$ , then show that  $\frac{2 \sin \theta - 3 \cos \theta}{4 \sin \theta - 9 \cos \theta} = 3$

42. 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 - IV

IV. Answer all the questions.

2x8=16

43. a) Draw  $\triangle ABC$ , where  $AB = 6$  cm,  $\angle B = 110^\circ$  and  $BC = 5$  cm and construct its orthocentre.

(OR)

b) Construct the incentre of  $\triangle ABC$  with  $AB = 6$  cm,  $\angle B = 65^\circ$  and  $AC = 7$  cm. Also draw the incircle and measure its radius.

44. a) Draw graph  $y = \frac{2}{3}x + 3$

(OR)

b) Solve graphically :  $x + y = 7$ ,  $x - y = 3$

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