A

COMMON HALF YEARLY EXAMINATION-2022
Standard - IX

Time : 3.00 hrs   MATHS   Marks: 100

Part - I

I. Choose the correct answer:-   14×1=14

1) If $A \cup B = A \cap B$ then
   i) $A \neq B$ ii) $A = B$ iii) $A \subset B$ iv) $B \subset A$

2) If A= {x, y, z} then the number of non-empty subsets of A is
   i) 8   ii) 5   iii) 6   iv) 7

3) $\sqrt{27} + \sqrt{12} =$
   i) $\sqrt{39}$ ii) $5\sqrt{6}$ iii) $5\sqrt{3}$ iv) $3\sqrt{5}$

4) If $\sqrt{80} = K\sqrt{5}$, then K=
   i) 2   ii) 4   iii) 8   iv) 16

5) Degree of the polynomial $(y^3-2)(y^3+1)$ is
   i) 9   ii) 2   iii) 3   iv) 6

6) If $(x-3)$ is a factor of P(x), then the remainder is
   i) 3   ii) -3   iii) P(3)   iv) P(-3)

7) If (2,3) is a solution of linear equation 2x+3y=K, then the value of K is
   i) 12   ii) 6   iii) 0   iv) 13

8) The exterior angle of a triangle is equal to the sum of two
   i) Exterior angles   ii) Interior opposite angles
   iii) Alternate angles   iv) Interior angles

9) If one angle of a cyclic quadrilateral is 75°, then the opposite angle is
   i) 100°   ii) 105°   iii) 85°   iv) 90°

10) The point whose ordinate is 4 and which lies on the y-axis is
   i) (4,0)   ii) (0,4)   iii) (1,4)   iv) (4,2)

11) The distance between the point (5,-1) and the origin is
   i) $\sqrt{24}$ ii) $\sqrt{37}$ iii) $\sqrt{26}$ iv) $\sqrt{17}$

12) The mid-point of the line joining (-a, 2b) and (-3a, -4b) is
   i) (-2a, 3b)   ii) (-2a, -b)   iii) (2a, b)   iv) (-2a, -3b)

13) Sin30°=x and Cos60°=y, then x^2+y^2 is
   i) ½   ii) 0   iii) Sin90°   iv) Cos90°

14) If $2\sin2\theta = \sqrt{3}$, then the value of θ is
   i) 90°   ii) 30°   iii) 45°   iv) 60°

Part - II

II. Answer any 10 questions. Q.No. 28 is compulsory:-   10×2=20

15) Write the set of letters of the following words in Roaster form
   i) ASSESSMENT   ii) PRINCIPAL

16) Verify whether A={20, 22, 23, 24} and B={25, 30, 40, 45} are disjoint sets.

17) Write 1.00005×10⁻⁵ in decimal form.

18) Rationalize the denominator. $\dfrac{\sqrt{75}}{\sqrt{18}}$

19) Factorise: $36m^2-49n^2$.

20) If $P(x) = x^2 - 2\sqrt{2}x + 1$, find $P(2\sqrt{2})$

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

22) Find the value of x° in the given figure.
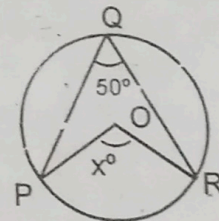
23) The chord of length 30cm is drawn at the distance of 8cm from the centre of the circle. Find the radius of the circle.

24) Define Circumcircle.

25) In which quadrant does the following points lie? a) (-1, -3)   b) (3, 8)

26) Find the distance between the pair of points (1,2) and (4,3)

27) If $2\cos\theta = \sqrt{3}$ then find the value of sec θ.

28) Verify: $Sin^2 60° + Cos^2 60° = 1$ [or]

Find the roots of the polynomial equations:- 10x+9=0

Part - III

III. Answer any 10 questions. Q.No. 42 is compulsory:-   10×5=50

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

30) 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.

31) Simplify using addition and substraction properties of surds. $5\sqrt[3]{40} + 2\sqrt[3]{625} - 3\sqrt[3]{320}$

32) Find the value of a and b if $\dfrac{\sqrt{7}-2}{\sqrt{7}+2} = a\sqrt{7}+b$

33) Solve by cross-multiplication method 6x+7y−11=0 and 5x+2y=13

34) Factorise using Synthetic Division. $x^3 - 5x^2 - 2x + 24$

35) The angles of a quadrilateral are in the ratio 2:4:5:7. Find all the angles.

36) 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.

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

38) Find the points which divide the line segment joining A(-11, 4) and B(9, 8) into four equal parts.

39) Find the centroid of the triangle whose vertices are. (-5, -5), (1, -4) and (-4,-2)

40) Find the value of: $\dfrac{\tan 45°}{\text{cosec } 30°} + \dfrac{\text{Sec } 60°}{\text{Cot } 45°} - \dfrac{5\sin 90°}{2\cos 0°}$

41) Find the value of: $\left(\dfrac{\cos 47°}{\sin 43°}\right)^2 + \left(\dfrac{\sin 72°}{\cos 18°}\right)^2 - 2\cos^2 45°$

42) Find the six trignometric ratios of the angle θ using the given diagram.   [or]
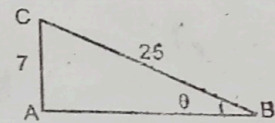
The sum of the two digits of a given two digit number is 5. If the digits are reversed, the new number is redused by 27. Find the given number.

Part - IV

IV. Answer the following questions:-   2×8=16

43) Construct the centroid ΔPQR whose sides are PQ=8cm; QR=6cm; RP=7cm. [or]
   Draw a triangle ABC, where AB=8cm, BC=6cm and ∠B=70° and locate its circumcentre and draw the circumcircle.

44) Draw the graph of y=3x−1.   [or]
   Solve graphically: x+y=7 ; x−y=3.

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