Tsi9M

Tenkasi District

Common Half Yearly Examination - 2024

16-12-2024

Standard 9

MATHEMATICS

Time: 3.00 Hours Marks: 100

Part - A

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

1) The set P={x|x∈z, −1 < x < 1} is a
a) singleton set b) powerset c) nullset d) subset

2) Let A = {ϕ} and B=P(A), then A∩B is
a) {ϕ,{ϕ}} b) {ϕ} c) ϕ d) {0}

3) 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

4) If $\sqrt{9^x} = \sqrt[3]{9^2}$, then x =
a) $\frac{2}{3}$ b) $\frac{4}{3}$ c) $\frac{1}{3}$ d) $\frac{5}{3}$

5) The type of the polynomial $4 - 3x^3$ is
a) constant polynomial b) linear polynomial
c) quadratic polynomial d) cubic polynomial

6) If P(a) = 0 then (x −a) is a ..... of P(x)
a) divisor b) quotient c) remainder d) factor

7) If (2, 3) is a solution of linear equation 2x + 3y = k then, the value of k is
a) 12 b) 6 c) 0 d) 13

8) The exterior angle of a triangle is equal to the sum of two .....
a) Exterior angles b) Interior opposite angles
c) Alternate angles d) Interior angles

9) If one angle of a cyclic quadrilateral is 75°, then the opposite angle is .....
a) 100° b) 105° c) 85° d) 90°

10) 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, 2)

11) The ratio in whic the x-axis divides the line segment joining the points $A(a_1, b_1)$ and $B(a_2, b_2)$ is
a) $b_1 : b_2$ b) $-b_1 : b_2$ c) $a_1 : a_2$ d) $-a_1 : a_2$

12) The point of intersection of x and y axes is called .....
a) zero point b) origin c) null point d) None of these

13) The value of $\frac{2\tan 30^\circ}{1-\tan^2 30^\circ}$ is equal to
a) cos 60° b) sin 60° c) tan 60° d) sin 30°

14) Given that $\sin\alpha = \frac{1}{2}$ and $\cos\beta = \frac{1}{2}$, then the value of $\alpha + \beta$ is
a) 0° b) 90° c) 30° d) 60°

Part - B

II. Answer any ten questions. (Q.No. 28 is compulsory) **10x2=20**

15) Represent the following sets is Rosterform
i) A = The set of all even natural numbers less then 20
ii) C = {x : x is a perfect cube, 27 < x < 216}

16) If U={a, b, c, d, e, f, g, h} A = {b, d, f, h} and B = {a, d, e, h} find A' ∪ B'

17) Find any 3 irrational numbers between 0.12 of 0.13

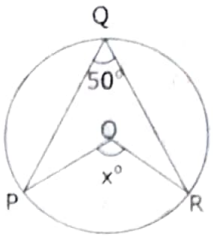
18) The mass of the Earth is 5.97×10^{24} kg and that of the Moon is 0.073×10^{24} kg. What is their total mass?

19) Find the zeros of the polynomial q(y) = 2y − 3

20) Solve the linear equations: x + 3y = 16, 2x − y = 4

21) The angles of a triangle are in the ratio 1 : 2 : 3 find the measure of each angle of the triangle

22) *Find the value of x° in the figure*

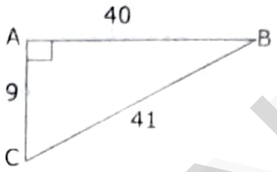


23) Find the distance between the points (3, 4) and (−7, 2)

24) The centre of a circle is (−4, 2). If one end of the diameter of the circle is (−3, 7), then find the other end.

25) Answer the following
   i) Write the mirror image of (2, 3) with respect to x axis
   ii) Name the points of the plane which do not belong to any of the quadrants

26) *Find any 3 trignometric ratios of angle B*



27) Evaluate $\frac{\sin 49^\circ}{\cos 41^\circ}$

28) Factorise $x^2 + 10x + 24$

Part - C

III. Any any Ten questions. Q.No: 42 is compulsory. **10x5=50**

29) Write down the power set of D = {p, q, r, s}

30) Verify $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ using venn diagrams

31) Simplify: $3\sqrt{75} + 5\sqrt{48} - \sqrt{243}$

32) If $x = \sqrt{5} + 2$ then find the value of $x^2 + \frac{1}{x^2}$

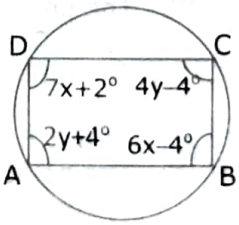
33) Expand: (3x−1)(3x+2)(3x−4)

34) Factorise: $x^3 - 3x^2 - 10x + 24$ using synthetic divisions

35) The sum of the numerator and denominator of a fraction is 12. If the denominator is increased by 3, the fraction becomes $\frac{1}{2}$. Find the fraction

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) *Find all the angles of the given cyclic quadrilateral ABCD in the figure*



38) Find the coordinates of the points of trisection of the line segment joining the points A(−5, 6) and B(4, −3)

39) 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

40) Verify $\cos 3A = 4\cos^3 A - 3\cos A$, when $A = 30^\circ$

41) Find the value of $\tan 7^\circ \tan 23^\circ \tan 60^\circ \tan 67^\circ \tan 83^\circ$

42) Each student in a class of 35 plays atleast one game among chess, carrom and table tennis. 22 play chess, 21 play carrom, 15 play table tennis, 10 play chess and table tennis, 8 play carrom and table tennis and 6 play all the three games. Find the number of students who play (i) chess and carrom but not table tennis (ii) only chess (iii) only carrom (Hint: Use venn diagram)

Part - D

IV. Do both the questions: **2x8=16**

43) a) Construct ΔPQR whose sides are PQ = 6cm, $\angle Q = 60^\circ$ and QR = 7cm and locate its orthocentre

(OR)

b) Draw a triangle ABC, where AB = 8cm, BC = 6cm and $\angle B = 70^\circ$ and locate its circumcentre and draw the circumcircle.

44) a) Draw the graph for y = 4x − 1

(OR)

b) Solve graphically the linear equation x + y = 7 and x − y = 3

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