TIRUVANNAMALAI DIST.

QUARTERLY EXAMINATION - 2024

QM

X - Std

MATHS
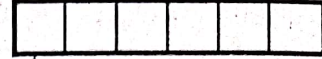
Time : 3.00 Hrs

Marks : 100

PART - A

I   **Choose the correct answer :-**   14 X 1 = 14

1. $A = \{a, b, c\}$, $B = \{2, 3\}$, $C = \{p, q, r, s\}$ then $n[(A \cup C) X C]$ is
   a) 8   b) 20   c) 12   d) 16

2.   If the ordered pairs $(a + 2, 4)$ and $(5, 2a + b)$ are equal than (a, b) is
   a) (2, –2)   b) (5, 1)   c) (2, 3)   d) (3, –2)

3. $f(x) = (x + 1)^3 – (x – 1)^3$ represents a function which is
   a) Linear   b) Cubic   c) Reciprocal   d) Quadratic

4.   If the HCF of 65 and 117 is expressible in the form of 65m - 117, then the value of m is
   a) 4   b) 2   c) 1   d) 3

5.   If 6 times of 6th term of an A.P. is equal to 7 times 7th term, then 13th term of the A.P. is
   a) 0   b) 6   c) 7   d) 13

6.   If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + ... + 2^0$ which of the following is true? a) B is 2^{64} more than A
   b) A and B are equal   c) B is larger than 1 by A   d) A is larger than 1 by B

7.   The solution of $(2x – 1)^2 = 9$ is equal to   a) –1   b) 2   c) –1, 2   d) None of these

8.   The square root of $\dfrac{256x^2y^4z^{10}}{25x^6y^6z^6}$ a) $\dfrac{16}{5}\left|\dfrac{x^2z^4}{y^2}\right|$ b) $16\left|\dfrac{y^2}{x^2z^4}\right|$ c) $\dfrac{16}{5}\left|\dfrac{y}{xz^2}\right|$ d) $\dfrac{16}{5}\left|\dfrac{xz^2}{y}\right|$

9. $\dfrac{3y-3}{y} \div \dfrac{7y-7}{3y^2}$ is   a) $\dfrac{9y}{7}$ b) $\dfrac{9y^3}{21y-21}$ c) $\dfrac{21y^2-42y+21}{3y^3}$ d) $\dfrac{7(y^2-2y+1)}{y^2}$

10.   If in $\triangle ABC$, DE ‖ BC, AB = 3.6cm, AC = 2.4cm and AD = 2.1 cm then the length of AE is
   a) 1.4 cm   b) 1.8 cm   c) 1.2 cm   d) 1.05 cm

11.   The straight line given by the equation is x = 11 is   a) Parallel to X axis
   b) Parallel to Y axis   c) Passing through the origin   d) Passing through the point (0, 11)

12.   If slope of the line PQ is $\dfrac{1}{\sqrt{3}}$ then the slope of perpendicular bisector of PQ is
   a) $\sqrt{3}$ b) $-\sqrt{3}$ c) $\dfrac{1}{\sqrt{3}}$ d) 0

13.   (2, 1) is the point of intersection of two lines.
   a) x – y – 3 = 0 ; 3x – y – 7 = 0   b) x + y = 3 ; 3x + y = 7
   c) 3x + y = 3, x + y = 7   d) x + 3y – 3 = 0 ; x – y – 7 = 0

14.   If $x = a \tan \theta$ and $y = a b \sec \theta$ then a) $\dfrac{y^2}{b^2} - \dfrac{x^2}{a^2} = 1$ b) $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 1$ c) $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} = 1$ d) $\dfrac{x^2}{a^2} - \dfrac{y^2}{b^2} = 0$

PART - B

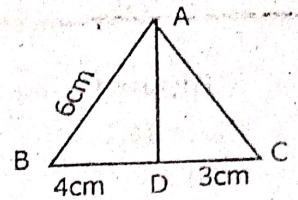**II**   **Answer any ten questions. Q.No. 28 is compulsory :-**   10 X 2 = 20

15.   Let A = {1, 2, 3} and B = {x/x is a prime number less than 10}. Find A X B and B X A.

16.   Given $f(x) = 2x – x^2$, find   (i) f(1) and   (ii) f(x + 1).

17.   The function 't' which maps temperature in Celsius (C) into temperature in Fahrenheit (F) is defined by
   $t(C) = F$ where $F = \dfrac{9}{5}C + 32$. Find, (i) t(0)   (ii) t(–10)

18.   Compute x, such that $10^4 \equiv x \pmod{19}$.

19.   Find x, y and z given that the numbers x, 10, y, 24, z are in A.P.

20.   Find the sum $3 + 1 + \dfrac{1}{3} + ...\infty$.

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21. Find the excluded values of the expression $\dfrac{x+10}{8x}$.

22. Determine the nature of the roots of quadratic equation $9a^2 b^2 x^2 - 24\ abcd\ x + 16c^2 d^2 = 0.\ a \neq 0, b \neq 0.$

23. Simplify $\dfrac{x^3}{x-y} + \dfrac{y^3}{x-y}$.

24. AD is the bisector of $\angle A$. If BD = 4cm, DC = 3cm and AB = 6cm find AC.

25. Show that the points P(−1.5, 3), Q(6, −2), R(−3, 4) are collinear.

26. Find the equation of a line whose intercepts on the x and y axes are 4 and −6 respectively.

27. Prove the identity : $\dfrac{\cos\theta}{1+\sin\theta} = \sec\theta - \tan\theta$.

28. Show that the straight lines $x - 2y + 3 = 0$ and $6x + 3y + 8 = 0$ are perpendicular.

PART - C

III   **Answer any TEN questions. (Q.No. 42 is compulsory)**   10 X 5 = 50

29. Let $A = \{x \in W : x < 2\}, B = \{x \in N : 1 < x \leq 4\}, C = \{3, 5\}$. Verify that $A X (B \cup C) = (A X B) \cup (A X C)$.

30. If the function f : R –> R is defined by $f(x) = \begin{vmatrix} 2x+7; & x < -2, \\ x^2 - 2; & -2 \leq x < 3, \\ 3x - 2; & x \geq 3. \end{vmatrix}$ then find the value of

    (i) f(4)   (ii) f(−2)   (iii) f(4) + 2f(1)   (iv) $\dfrac{f(1) - 3f(4)}{f(-3)}$.

31. If f(x) = x − 4, g(x) = x², h(x) = 3x − 5 then prove that (fog)oh = fo(goh).

32. A mother divides Rs. 207 into three parts such that the amount are in A.P. and gives it to her three children. The product of the two least amounts that the children had Rs. 4623. Find the amount received by each child.

33. Find the G.P. in which the 2nd term is $\sqrt{6}$ and 6th term is $9\sqrt{6}$.

34. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square, find the value of a and b.

35. The roots of the equation $2x^2 - 7x + 5 = 0$ are α and β. With out solving for the roots find (i) $\dfrac{1}{\alpha} + \dfrac{1}{\beta}$ (ii) $\dfrac{\alpha}{\beta} + \dfrac{\beta}{\alpha}$.

36. Solve the following system of linear equations in three variables $3x - 2y + z = 2$, $2x + 3y - z = 5$, $x + y + z = 6$.

37. State and prove Thales theorem.

38. Find the area of the quadrilateral formed by the points (8, 6) (5, 11), (−5, 12) and (−4, 3).

39. Find the equation of the perpendicular bisector of the line joining the points A(−4, 2) & B (6, −4).

40. Two buildings of different height are located at opposite sides of each other. If a heavy rod is attached joining the terrace of the buildings from (6, 10) to (14, 12), find the equation of the rod joining the buildings?

41. If $\dfrac{\cos\theta}{1+\sin\theta} = \dfrac{1}{a}$ then prove that $\dfrac{a^2 - 1}{a^2 + 1} = \sin\theta$.

42. Rekha has 15 square colour papers of sizes 10cm, 11cm, 12cm, ..., 24 cm. How much area can be decorated with these colour papers?

PART - D

IV   **Answer all the questions :-**   2 X 8 = 16

43. a) Construct a triangle similar to a given triangle PQR with its sides equal to 4/5 of the corresponding sides of the triangle PQR (scale factor 4/5 < 1).*(OR)*

    b) Construct a PQR which the base PQ = 4.5cm, $\angle R = 35^0$ and the median RG from R to PQ is 6cm.

44. a) A bus is travelling at a uniform speed of 50km/hr. Draw the distance - time graph and hence find (i) the constant of variation (ii) how far will it travel in 90 minutes? (iii) the time required to cover a distance of 300km from the graph, *(OR)* b) Draw the graph of xy = 24, x, y > 0. Using the graph find (i) y when x = 3 and (ii) x when y = 6.

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