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Standard X

Reg.No. :

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MATHEMATICS

Marks: 100

14 x 1 = 14

Time: 3.00 hrs.

Part - I

I. Choose the correct answer:

- Let $A = \{1, 2, 3, 4\}$ and $B = \{4, 8, 9, 10\}$. A function $f: A \rightarrow B$ given by $f = \{(1, 4), (2, 8), (3, 9), (4, 10)\}$ is a
 - many-one function
 - identity function
 - one-to-one function
 - into function
- If $A = \{x / x \in \mathbb{N}, x \leq 4\}$, $B = \{y / y \in \mathbb{N}, y < 3\}$, then $n(A \times B) =$
 - 12
 - 8
 - 7
 - 4
- The first term of an arithmetic progression is unity and the common difference is 4. Which of the following will be a term of this A.P
 - 4551
 - 10091
 - 7881
 - 13531
- The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \dots$ is
 - $\frac{1}{24}$
 - $\frac{1}{27}$
 - $\frac{2}{3}$
 - $\frac{1}{81}$
- A system of three linear equations in three variables is inconsistent if their planes
 - intersect only at a point
 - intersect in a line
 - coincides with each other
 - do not intersect
- The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to
 - $\frac{16}{5} \sqrt{\frac{x^2z^4}{y^2}}$
 - $16 \sqrt{\frac{y^2}{x^2z^4}}$
 - $\frac{16}{5} \sqrt{\frac{y}{xz^2}}$
 - $\frac{16}{5} \sqrt{\frac{xz^2}{y}}$
- Transpose of a column matrix is
 - unit matrix
 - diagonal matrix
 - column matrix
 - row matrix
- A tangent is perpendicular to the radius at the
 - centre
 - point of contact
 - infinity
 - chord
- A man walks near a wall, such that the distance between him and the wall is 10 units, consider the wall to be the y-axis. The path travelled by the man is
 - $x = 10$
 - $y = 10$
 - $x = 0$
 - $y = 0$
- The equation of a line passing through the origin and perpendicular to the line $7x - 3y + 4 = 0$
 - $7x - 3y + 4 = 0$
 - $3x - 7y + 4 = 0$
 - $3x + 7y = 0$
 - $7x - 3y = 0$

kindly send me your key Answers to our email id - padasalai.net@gmail.com

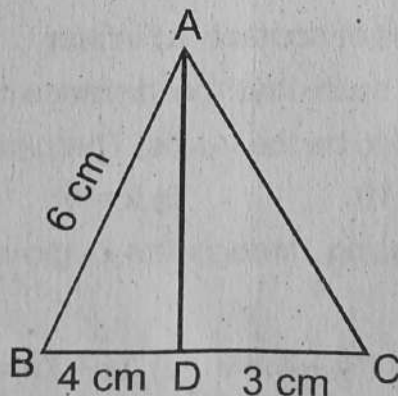
11. The angle of elevation of a cloud from a point h meters above a lake is β . The angle of depression of its reflection in the lake is 45° . The height of location of the cloud from the lake is
- a) $\frac{h(1 + \tan\beta)}{1 - \tan\beta}$ b) $\frac{h(1 - \tan\beta)}{1 + \tan\beta}$ c) $h(\tan 45^\circ - \beta)$ d) none of these
12. If the radius of the base of a right circular cylinder is halved keeping the same height, then the ratio of the volume of the cylinder thus obtained to the volume of original cylinder is
- a) 1 : 2 b) 1 : 4 c) 1 : 6 d) 1 : 8
13. If the radius of the base of a cone is doubled and the height is tripled then the volume is
- a) made 6 times b) made 18 times c) made 12 times d) unchanged
14. A purse contain 10 notes of ₹2000, 15 notes of ₹500 and 25 notes of ₹200. One note is drawn at random. What is the probability that the note is either ₹500 note or ₹200 note?
- a) $\frac{1}{5}$ b) $\frac{3}{10}$ c) $\frac{2}{3}$ d) $\frac{4}{5}$

Part - II

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

10 x 2 = 20

15. Represent the given relation by (a) an arrow diagram (b) a graph and (c) a set in roster form, wherever possible : (i) $\{(x,y) / x = 2y, x \in \{2,3,4,5\}, y \in \{1,2,3,4\}\}$
16. Show that the function $f:N \rightarrow N$ defined by $f(x) = 2x - 1$ is one-one but not onto.
17. Which term of an A.P 16, 11, 6, 1, is -54
18. Write the each of the following expression in terms of $\alpha + \beta$ and $\alpha\beta$: $\frac{1}{\alpha^2\beta} + \frac{1}{\beta^2\alpha}$
19. The product of kumaran's age (in years) two years ago and his age four years from now in one more than twice his present age. What is his present age?
20. In the fig, AD is the bisector find $\angle A$. If $BD = 4$ cm, $DC = 3$ cm and $AB = 6$ cm, find AC.



21. Find the intercepts made by the following lines on the co-ordinate axes $3x - 2y - 6 = 0$
 22. Find the sum of $1 + 8 + 27 + \dots + 1000$

23. Prove that : $\frac{\sin A}{1 + \cos A} = \frac{1 - \cos A}{\sin A}$

24. A kite is flying at a height of 75 m above the ground. The string attached to the kite is temporarily tied to a point on the ground. The inclination of the string with the ground is 60° . Find the length of the string, assuming that there is no slack in the string.
 25. The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2 . Find the diameter of the cylinder.
 26. The volumes of two cones of same base radius of 3600 cm^3 and 5040 cm^3 . Find the ratio of heights.
 27. Three fair coins are tossed together. Find the probability of getting atleast one tail.
 28. Find the equation of the ladder whose inclination at 60° to the floor and touches the wall at (0,8)

Part - III

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

10 x 5 = 50

30. $A = \{x \in \mathbb{N} / 1 < x < 4\}$, $B = \{x \in \mathbb{W} / 0 \leq x < 2\}$ and $C = \{x \in \mathbb{N} / x < 3\}$, then verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$

31. A function $f: [-5, 9] \rightarrow \mathbb{R}$ is defined as follows. $f(x) = \begin{cases} 6x + 1 & ; -5 \leq x < 2 \\ 5x^2 - 1 & ; 2 \leq x < 6 \\ 3x - 4 & ; 6 \leq x \leq 9 \end{cases}$

32. Find (i) $f(7) - f(1)$ (ii) $2f(4) + f(8)$
 33. Find the sum of all natural numbers between 300 and 600 which are divisible by 7.
 34. Find the square root of the following polynomial by division method.
 $121x^4 - 198x^3 - 183x^2 + 216x + 144$
 35. A passenger train takes 1 hr more than an express train to travel a distance of 240 km from Chennai to Virudhachalam. The speed of the express train is more than that of the passenger train by 20 km per hour. Find the average speed of both the trains.

36. If $A = \begin{pmatrix} 3 & 1 \\ -1 & 2 \end{pmatrix}$, show that $A^2 - 5A + 7I_2 = 0$

37. State and prove Pythagoras Theorem.

38. Find the value of k, If the area of a quadrilateral is 28 sq.units. Whose vertices are taken in the order $(-4, -2)$, $(-3, k)$, $(3, -2)$ and $(2, 3)$

39. Find the equation of the straight line through the intersection of lines $5x - 6y = 2$, $3x + 2y = 10$ and perpendicular to the line $4x - 7y + 13 = 0$

38. Prove that $\left(\frac{\cos^3 A - \sin^3 A}{\cos A - \sin A}\right) - \left(\frac{\cos^3 A + \sin^3 A}{\cos A + \sin A}\right) = 2 \sin A \cos A$

39. If the radii of the circular ends of a frustum which is 63 cm high are 15 cm and 8 cm, find the volume of the frustum in litres.

40. Find the coefficient of variation : 24, 26, 33, 37, 29, 31

41. In an apartment, in selecting a house from door numbers 1 to 100 randomly. Find the probability of getting the door number of the house to be an even number or a perfect Square number or a perfect cube number.

42. In a G.P the 9th term is 32805 and 6th term is 1215. Find the 12th term.

Part - IV

IV. Answer all the questions.

2 x 8 = 16

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

(OR)

b) draw the two tangents from a point which is 5 cm away from the centre of a circle of diameter 6 cm. Also, measure the lengths of the tangents.

44. a) A School announcer that for a certain competitions, the cash price will be distributed for all the participants equally as shown below.

No. of participants (x)	2	4	6	8	10
Amount for each participant in ₹ (y)	180	90	60	45	36

- Find the constant of variation
- Graph the above data and hence, find how much will each participant get if the number of participants are 12.

(OR)

b) Draw the graph of $x^2 - 9x + 20 = 0$ and state the nature of their solutions.
