Salem (Dt)

TRS

THIRD REVISION EXAMINATION- 2024

10 - STD   **MATHEMATICS**

Time : 3.00 Hrs   Marks : 100

PART - I

CHOOSE THE CORRECT ANSWER: 14 X 1 = 14

1. Let A={1,2,3,4} and B={4,8,9,10}. A function f: A→ B given by f = {(1,4), (2,8), (3,9), (4,10)} is a

(a) Many- one function   (b) Identity function   (c) One-to-one function   (d) Into function

2. $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is

(a) Linear   (b) cubic   (c) reciprocal   (d) quadratic

3. Using Euclid's division lemma, if the cube of any positive integer is divided by 9 then the possible remainders are   (a) 0,1,8   (b) 1,4,8   (c) 0,1,3   (d) 1,3,5

4. In an A.P. the first term is 1 and the common difference is 4. How many terms of the A.P. must betaken for their sum to be equal to 120?

(a) 6   (b) 7   (c) 8   (d) 9

5. The values of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are

(a) 100,120   (b) 10,12   (c) −120,100   (d) 12,10

6. The roots of a quadratic equation $4x^2 - 9x + 2 = 0$ are

(a) -2, $\frac{1}{4}$ (b) -4, $\frac{1}{2}$ (c) 2, $\frac{1}{4}$ (d) -4, $\frac{-1}{2}$

7. $3\sqrt{x}$ = 9 then value of x is

(a) 3   (b) 9   (c) 1   (d) $\frac{1}{3}$

8. The two tangents from an external points P to a circle with centre at O are PA and PB. If ∠APB = 70° then the value of ∠AOB is

(a)100°   (b) 110°   (c) 120°   (d) 130°

9. The point of intersection of 3x−y = 4 and x+y = 8 is

(a) (5,3)   (b)(2,4)   (c) (3,5)   (d) (4,4)

10. $(cot\theta + cosec\theta)(cot\theta - cosec\theta)$ is

(a) 1   (b) 0   (c) -1   (d) $2cot\theta$

11. A tower is 60 m height. Its shadow is x metres shorter when the sun's altitude is 45°than when it has been 30°, then x is equal to

(a) 41.92m   (b) 43.92m   (c) 43m   (d) 45.6 m

12. In a hollow cylinder, the sum of the external and internal radii is 14cm and the width is 4 cm. If its height is 20 cm, the volume of the material in it is

(a) 5600πcm³   (b) 11200πcm³   (c) 56π cm³   (d) 3600π cm³

13. The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is

(a) 1:2:3   (b) 2:1:3   (c) 1:3:2   (d) 3:1:2

14. If P(A∩B)= 0.3 . P($\overline{A}$ ∩B)=0.45 then value of P(B)

(a) 0.14   (b) 0.30   (c) 0.75   (d) 1

PART - II

ANSWER ANY 10 QUESTIONS. QUESTION NO.28 IS COMPULSORY: 10 X 2 = 20

15. Let A = {1,2,3,7} and B = {3,0,−1, 7}, which of the following are relation from A to B?

(i) R₁ = {(2,1), (7,1)}   (ii) R₂ = {(−1,1)}

16. Let f(x) = x²− 1. Find f o f o f

17. Compute x, such that $10^4 \equiv$ x (mod 19)

18. Find the sum $3+1+\frac{1}{3}$ +....∞

19. Find the square root of the following rational expression. $\frac{400}{100}$ $\frac{x^4 y^{12} z^{16}}{x^8 y^4 z^4}$

20. Determine the quadratic equation, whose sum and product of roots are $\frac{-3}{2}, -1$

21. In Δ ABC , D and E are points on the sides AB and AC respectively such that DE ∥ BC

(i) If $\frac{AD}{DB} = \frac{3}{4}$ and AC = 15 cm and find AE

22. Find the equation of a straight line which has slope $\frac{-5}{4}$ and passing through the point $(−1,2)$

23. Check whether the given lines are perpendicular

5x + 23y + 14 = 0 and 23x − 5y + 9 = 0

24. Prove the identity $\sec^6 \theta = \tan^6 \theta + 3 \tan^2 \theta \sec^2 \theta +1$

25. A player sitting on the top of a tower of height 20 m observes the angle of depression of a ball lying on the ground as 60° .Find the distance between the foot of the tower and the ball.($\sqrt{3}$ = 1.732)

26. Find the volume of a cylinder whose height is 2 m and whose base are is 250 m².

27. what is the probability that a leap year selected at random will contain 53 saturdays.

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

PART - III

ANSWER ANY 10 QUESTIONS. QUESTION NO.42 IS COMPULSORY: 10X5=50

29. Let A = {x ∈ W| x<2}, B = {x ∈ N| 1< x ≤4} and C = {3,5}. Verify that (AUB) XC = (AXC) U (BXC)

30. Let f:A→B be a function defined by f(x) = $\frac{x}{2} - 1$, where A = {2,4,6,10,12}, B ={0,1,2,4,5,9}. Represent f by   (i) set of ordered pairs   (ii) a table   (iii) an arrow diagram   (iv) a graph

31. If $p_1^{x_1} X p_2^{x_2} X p_3^{x_3} X p_4^{x_4}$ = 113400 where p_1, p_2, p_3, p_4 are primes in ascending order and x_1, x_2, x_3, x_4 are integers, find the value of p_1, p_2, p_3, p_4 and x_1, x_2, x_3, x_4 .

32. The sum of first n, 2n and 3n terms of an A.P. are S_1, S_2 and S_3 respectively .

   Prove that $S_3 = 3(S_2 - S_1)$

33. A bus covers a distance of 90 km at a uniform speed. Had the speed been 15 km/hour more it would have taken 30 minutes less for the journey. Find the original speed of the bus.

34. If A = $\begin{pmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{pmatrix}$, B = $\begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$ Verify that $(AB)^T = B^T A^T$

35. State and prove angle bisector theorem.

36. If verties of a quadrilateral are at A(−5,7), B(−4, k), C(−1,− 6) and D (4, 5) and its area is 72 sq.units. Find the value of k.

37. A line makes positive intercepts on coordinate axes whose sum is 7 and it passes through (−3,8) . Find its equation.

38. The horizontal distance between two buildings is 140 m. The angle of depression of the top of the first building when seen from the top of the second building is 30° . If the height of the first building is 60 m, find the height of the second building. ($\sqrt{3}$ = 1.732)

39. Nathan , an engineering student was asked to make a model shaped like a cylinder with two cones attached at its two ends. The diameter of the model is 3 cm and its length is 12 cm. If each cone has a height of 2 cm, find the volume of model that Nathan made.

40. The slant height of a frustum of a cone is 4 m and the perimeter of circular ends are 18 m and 16 m. Find the cost of painting its curved surface area at ₹100 per sq.m.

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41. The rainfall recorded in various places of five districts in a week are given below. Find its standard deviation.

Rainfall (in mm)	45	50	55	60	65	70
Number of places	5	13	4	9	5	4

42. Anand chooses a date at random in April month for a tour program. Find the probability that he chooses (i) a Monday

(ii) a Wednesday

(iii) a Friday

(iv) a Saturday or a Sunday

	April			
Monday		4	11	18	25
Tuesday		5	12	19	26
Wednesday		6	13	20	27
Thursday		7	14	21	28
Friday	1	8	15	22	29
Saturday	2	9	16	23	30
Sunday	3	10	17	24	

PART - IV

ANSWER ALL THE QUESTIONS: 2X8=16

43 a) Draw a circle of diameter 6 cm from a point P, which is 8 cm away from its centre.

Draw the two tangents PA and PB to the circle and measure their lengths. *(OR)*

b) Construct a ΔPQR such that QR =6.5 cm, $\angle P = 60°$ and the altitude from P to QR is of length

4.5 cm.

44 a) Draw the graph of y= x^2 +x and hence solve $x^2 + 1 = 0$ *(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