ACHIEVEMENT TEST II - 2025

MATHEMATICS

TIME : 2.00 Hrs STANDARD -X MARKS:100

PART I

CHOOSE THE CORRECT ANSWER: 19X1=19

1. If A={1,2}, B={1,2,3,4},C={5.6} and D={5,6,7,8} then state which of the following statement is true

(a) (AXC)⊂ (BXD) (b) (BXD) ⊂(AXC) (c) (AXB)⊂ (AXD) (d) (DXA)⊂ (BXA)

2. If g = {(1,1),(2,3),(3,5),(4,7)} is a function given by g(x) = $\alpha x+\beta$ the values of α and β are

(a) (-1,2) (b) (2,-1) (c) (-1,-2) (d) (1,2)

3. 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

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

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

5. A system of three linear equations in three variables is inconsistent if their planes

(a) intersect only at a point (b) intersect in a line

(c) coincides with each other (d) do not intersect

6. The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ is equal to

(a) $\frac{16}{5}\left|\frac{x^2z^4}{y^2}\right|$ (b) $16\left|\frac{y^2}{x^2z^4}\right|$ (c) $\frac{16}{5}\left|\frac{y}{xz^2}\right|$ (d) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$

7. Find the matrix X if $2X+\begin{pmatrix}1 & 3\\ 5 & 7\end{pmatrix}=\begin{pmatrix}5 & 7\\ 9 & 5\end{pmatrix}$

(a) $\begin{pmatrix}-2 & -2\\ 2 & -1\end{pmatrix}$ (b) $\begin{pmatrix}2 & 2\\ 2 & -1\end{pmatrix}$ (c) $\begin{pmatrix}1 & 2\\ 2 & 2\end{pmatrix}$ (d) $\begin{pmatrix}2 & 1\\ 2 & 2\end{pmatrix}$

8. The perimeters of two similar triangles ΔABC and ΔPQR are 36cm and 24 cm respectively. If PQ = 10 cm, then the length of AB is

(a) $6\frac{2}{3}$cm (b) $\frac{10\sqrt{6}}{3}$cm (c) $66\frac{2}{3}$cm (d) 15cm

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

(a) 100° (b) 110° (c) 120° (d) 130°

10. 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

(a) $x = 10$ (b) $y = 10$ (c) $x = 0$ (d) $y = 0$

11. 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)

12. If $5x = \sec\theta$ and $\frac{5}{y} = \tan\theta$, then $x^2 - \frac{1}{y^2}$ is equal to

(a) 25 (b) $\frac{1}{25}$ (c) 5 (d) 1

13. The electric pole subtends an angle of 30° at a point on the same level as its foot. At a second point 'b' metres above the first, the depression of the foot of the pole is 60°. The height of the pole (in metres) is equal to

(a) $\sqrt{3}\,b$ (b) $\frac{b}{3}$ (c) $\frac{b}{2}$ (d) $\frac{b}{\sqrt{3}}$

14. 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) $5600\pi cm^3$ (b) $11200\pi cm^3$ (c) $56\pi\ cm^3$ (d) $3600\pi\ cm^3$

15. A solid sphere of radius x cm is melted and cast into a shape of a solid cone of same radius. The height of the cone is

(a) 3xcm (b) xcm (c) 4xcm (d) 2xcm

16. A spherical ball of radius r_1 units is melted to make 8 new identical balls each of radius r_2 units. Then $r_1 : r_2$ is

(a) 2:1 (b) 1:2 (c) 4:1 (d) 1:4

17. The mean of 100 observations is 40 and their standard deviation is 3. The sum of squares of all observations is

(a) 40000 (b) 160900 (c) 160000 (d) 30000

18. A page is selected at random from a book. The probability that the digit at units place of the page number chosen is less than 7 is

(a) $\frac{3}{10}$ (b) $\frac{7}{10}$ (c) $\frac{3}{9}$ (d) $\frac{7}{9}$

19. Kamalam went to play a lucky draw contest. 135 tickets of the lucky draw were sold. If the probability of Kamalam winning is $\frac{1}{9}$, then the number of tickets bought by Kamalam is

(a) 5 (b) 10 (c) 15 (d) 20

PART II

ANSWER ANY 7 QUESTIONS. 7X2=14

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

21. Represent the given relation by (i) an arrow diagram (ii) a set in roster form , wherever possible.

{(x,y)|x = 2y, x∈ {2,3,4,5}, y∈ {1,2,3,4}

22. Which term of an A.P 16, 11,6,1,...is -54?

23. Find the 8th term of the G.P. 9,3,1,..

24. $A=\begin{pmatrix}0 & 4 & 9\\ 8 & 3 & 7\end{pmatrix}$ $B=\begin{pmatrix}7 & 3 & 8\\ 1 & 4 & 9\end{pmatrix}$ find the value of B- 5A.

25. A man goes 18 m due east and then 24 m due north. Find the distance of his current position from the starting point?

26. If radii of two concentric circles are 4 cm and 5 cm then find the length of the chord of one circle which is a tangent to other circle.

27. The line r passes through the points (-2, 2) and (5, 8) and the line s passes through the points (-8, 7) and (-2, 0). Is the line r perpendicular to s?

28. Find the standard deviation of first 21 natural numbers.

29. A coin is tossed thrice. What is the probability of getting two consecutive tails?

PART III

ANSWER ANY 7 QUESTIONS. 7X5=35

30. Let A= The set of all natural numbers less than 8, B= The set of all prime numbers less than 8, C= The set of even prime number. Verify that AX(B–C)=(AXB)–(AXC)

31. Let A={1,2,3,4} and B={2,5,8,11,14} be two sets. Let f: A→ B be a function given by f(x)=3x−1. Represent this function (i) by arrow diagram (ii) in a table form (iii) as a set of ordered pairs (iv) in a graphical form.

32. A mother divides ₹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 ₹4623 . Find the amount received by each child.

33. Find the sum to n terms of the series 5+55+555+....

34. If $36x^4 - 60x^3 + 61x^2 - mx + n$ is a perfect square, find the values of m and n .

35. If $A = \begin{pmatrix} 1 & 2 & 1 \\ 2 & -1 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 2 & -1 \\ -1 & 4 \\ 0 & 2 \end{pmatrix}$ Verify that $(AB)^T = B^T A^T$

36. State and prove angle bisector theorem.

37. If the vertices of a Δ ABC are A (6,2), B(-5, -1) and C (1,9) (i) find the equation of median (ii) find the equation of altitude.

38. The marks scored by 10 students in a class test are 25, 29, 30, 33, 35, 37, 38, 40, 44, 48. Find the standard deviation.

39. Three unbiased coins are tossed once. Find the probability of getting atmost 2 tails or atleast 2 heads.

PART IV

ANSWER ALL QUESTIONS: (QUESTION NO. GIVEN AS PER PUBLIC EXAMINATION) 4X8=32

43. (a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{2}{3}$ of the corresponding sides of the triangle PQR (scale factor to $\frac{2}{3}$ <1)

(b) 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.

44. (a) The following table shows the data about the number of pipes and the time taken to till the same tank.

No. of pipes (x)	2	3	6	9
Time Taken (in min) (y)	45	30	15	10

Draw the graph for the above data and hence
(i) find the time taken to fill the tank when five pipes are used
(ii) Find the number of pipes when the time is 9 minutes.

(b) A garment shop announces a flat 50 % discount on every purchase of items for their customers. Draw the graph for the relation between the Marked Price and the Discount. Hence find
(i) the marked price when a customer gets a discount of Rs. 3250 (from graph)
(ii) the discount when the marked price is Rs. 2500