US-MC-24 10M-TF

Full Portion Test - 3

Standard X

MATHEMATICS

Time : 3.00 hrs. Maximum Marks : 100

Instructions: 1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

2) Use Black or Blue ink to write and underline and pencil to draw diagrams.

PART - I

Note: i) Answer all the questions. 14x1=14

ii) Choose the most suitable answer from the given four alternatives and write the option code and the corresponding answer.

1. If $n(A \times B) = 12$ and $A = \{p, q, r\}$ then $n(B)$ is

   a) 3 b) 4 c) 7 d) 12

2. Let $f(x) = \sqrt{1+x^2}$ then

   a) $f(xy) = f(x).f(y)$ b) $f(xy) \geq f(x).f(y)$

   c) $f(xy) \leq f(x).f(y)$ d) None of these

3. An A.P consists of 31 terms. If its 16^{th} term is m, then the sum of all the terms of this A.P is

   a) 16 m b) 62 m c) 31 m d) $\frac{31}{2}$ m

4. If $(x-6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$, then the value of k is

   a) 3 b) 5 c) 6 d) 8

5. For the given matrix $A = \begin{bmatrix} 1 & 2 & 3 & 5 \\ 6 & 4 & 2 & 1 \end{bmatrix}$ the order of the matrix is

   a) 2×3 b) 3×2 c) 3×4 d) 4×2

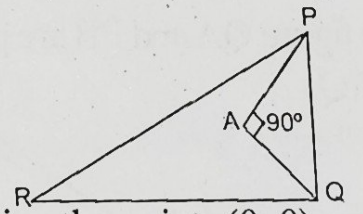
6. In ΔLMN, $\angle L = 60°$, $\angle M = 50°$, if $\Delta LMN \sim \Delta PQR$, then the value of $\angle R$ is

   a) 40° b) 70° c) 30° d) 110°

7. In the given figure, PR = 26 cm QR = 24 cm, $\angle PAQ = 90°$, PA = 6 cm and QA = 8 cm find $\angle PQR$

   a) 80° b) 85°

   c) 75° d) 90°



8. The slope of the line which is perpendicular to a line joining the points (0, 0) and (–8, 8) is

   a) –1 b) 1 c) $\frac{1}{3}$ d) –8

9. The straight lines $3x-4y+9=0$ and $3x-4y-9=0$ are
   a) intersect at the point $(-9, 0)$
   b) intersect at the point $(0, 9)$
   c) intersect at the point $(4, 3)$
   d) not cut at any point

10. 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

11. A tower is 60 m high. Its shadow reduces by x metres when the angle of elevation of the sun increases from 30° to 45°, then x is equal to
   a) 41.92 m
   b) 43.92 m
   c) 43 m
   d) 45.6 m

12. The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be
   a) 12 cm
   b) 10 cm
   c) 13 cm
   d) 5 cm

13. A soild 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) 3x cm
   b) x cm
   c) 4x cm
   d) 2x cm

14. If the standard deviation of x, y, z is p then the standard deviation of 3x+5, 3y+5, 3z+5 is
   a) 3p + 5
   b) 3p
   c) p + 5
   d) 9p + 15

Part - II

Note: i) Answer any ten questions.
ii) Question No.28 is compulsory.

10x2=20

15. Let $A = \{1, 2, 3\}$ and $B = \{x \mid x \text{ is a prime number less than } 10\}$. Find $A \times B$ and $B \times A$.

16. If $f(x) = 2x + 3$ and $g(x) = 2x - 1$, then find $f \circ g$.

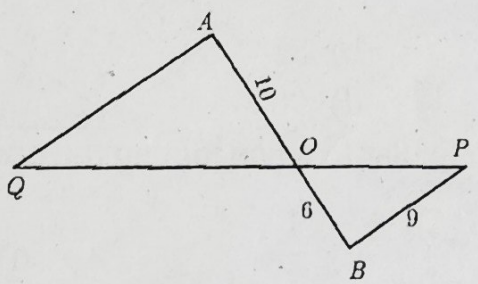
17. If $13824 = 2^a \times 3^b$ then find a and b.

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

19. Simplify: $\frac{x+4}{3x+4y} \times \frac{9x^2-16y^2}{2x^2+3x-20}$

20. Verify that $A^2 = I$ when $A = \begin{bmatrix} 5 & -4 \\ 6 & -5 \end{bmatrix}$

21. In the figure QA and PB are perpendicular to AB. If AO = 10 cm, BO = 6 cm and PB = 9cm. Find AQ.



22. Calculate the slope and y intercept of the straight line $8x-7y+6=0$

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23. Show that the straight lines $2x+3y-8=0$ and $4x+6y+18=0$ are parallel.

24. Prove that $\frac{\sin A}{1+\cos A}+\frac{\sin A}{1-\cos A}=2\operatorname{cosec} A$.

25. The slant height of a frustum of a cone is 5 cm and the radii of its ends are 4 cm and 1 cm. Find its curved surface area.

26. If the ratio of radii of two spheres is 4 : 7, find the ratio of their volumes.

27. If the mean and co-efficient of variation of a data 15 and 48 respectively, then find the value of standard deviation.

28. A building and a statue are in opposite side of a street from each other 35 m apart. From a point on the root of building the angle of elevation of the top of statue is 24° and the angle of depression of base of the statue is 34°, then draw a diagram explain the above.

Part - III

24° = 0.4452
34° = 0.6745

Note: i) Answer any ten questions.
ii) Question No.42 is compulsory.

10x5=50

29. Let $A=\{1, 2, 3, 4\}$ and $B=\{2, 5, 8, 11, 14\}$ be two sets. Let $f: A \to B$ 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.

30. If $f(x)=x^2$, $g(x)=2x$ and $h(x)=x+4$, then prove that $(f\circ g)\circ h = f\circ(g\circ h)$.

31. The 13th term of an A.P is 3 and the sum of first 13 terms is 234. Find the common difference and the sum of first 21 terms.

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

33. If α and β are the roots of $x^2+7x+10=0$ find the values of (i) $\alpha-\beta$ (ii) $\alpha^2+\beta^2$ (iii) $\alpha^3-\beta^3$ (iv) $\alpha^4+\beta^4$ (v) $\frac{\alpha}{\beta}+\frac{\beta}{\alpha}$.

34. Solve: $\begin{pmatrix} 2 & -3 \\ 1 & 1 \end{pmatrix}\begin{pmatrix} x \\ y \end{pmatrix}=\begin{pmatrix} 6 \\ 1 \end{pmatrix}$

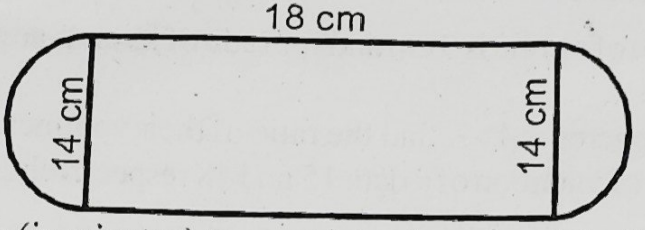
35. State and prove Thales Theorem.

36. Find the equation of a straight line parallel to Y axis and passing through the point of intersection of the lines $4x+5y=13$ and $x-8y+9=0$.

37. From the top of a tree of height 13 m the angle of elevation and depression of the top and bottom of another tree are 45° and 30° respectively. Find the height of the second tree $(\sqrt{3}=1.732)$.

38. A solid iron cylinder has total surface area of 1848 sq.cm. Its curved surface area is five-sixt of its total surface area. Find the radius and height of the iron cylinder.

39. Find the total surface area and volume of a given figure using the mesurement in the give figure.



40. The time taken (in minutes) to complete a homework by 8 students in a day are given by 38 40, 47, 44, 46, 43, 49, 53. Find the coefficent of variation.

41. A coin is tossed thrice. Find the probability of getting exactly two heads or atleast one tail o two consecutive heads.

42. Find the equation of a straight line which passing through (–8, 4) and making equal intercept on the coordinte axes.

Part - IV

Note: Answer the following questions: 2x8=1

43. a) Draw a circle of radius 4 cm. At a point L on it draw a tangent to the circle using th alternate segment.

(OR)

b) Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{6}{5}$ of th corresponding sides of the triangle ABC (scale factor $\frac{6}{5}>1$)

44. a) Draw the graph of $xy = 24$, $x, y > 0$ using the graph find
i) y when $x = 3$ and ii) x when $y = 6$

(OR)

b) Draw the graph of $y = 2x^2 - 3x - 5$ and hence solve $2x^2 - 4x - 6 = 0$.

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