# 10TH - MATHEMATICS - FULL TEST - 2

MARKS : 100
TIME : 3 Hrs.

## PART - I

14 x 1 = 14

Choose the correct Answer :-

1. If $(A \times B) = 6$ and $A = \{1, 3\}$, then $n(B)$ is
A) 1 B) 2 C) 3 D) 4

2. let $n(A) = p$ and $n(B) = q$, then the total number of non-empty relation that can be defined from A to B is
A) $p^q$ B) $q^p$ C) $2^{pq}$ D) $2^{pq} - 1$

3. In an A.P $3\sqrt{2}, 5\sqrt{2}, 7\sqrt{2}, \ldots$ then find $9^{th}$ term.
A) $16\sqrt{2}$ B) 19 C) $19\sqrt{3}$ D) $19\sqrt{2}$

4. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots$ is
A) $\frac{1}{24}$ B) $\frac{1}{27}$ C) $\frac{2}{3}$ D) $\frac{1}{81}$

5. If A is a $2 \times 3$ matrix and B is a $3 \times 4$ matrix how many rows does AB have
A) 3 B) 2 C) 4 D) 5

6. The values of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are
A) 100, 200 B) 10, 12 C) −120, 100 D) 12, 10

7. In $\Delta LMN$, $\angle L = 60^\circ$, $\angle M = 50^\circ$. If $\Delta LMN \sim \Delta PQR$ then the value of $\angle R$ is
A) $40^\circ$ B) $70^\circ$ C) $30^\circ$ D) $110^\circ$

8. Find the equation of a straight line passing through (5, 7) and is parallel to y-axis is
A) $x = 5$ B) $y = 5$ C) $x = 7$ D) $y = 7$

9. The straight line given by the equation $x=11$ is

A) parallel to x-axis B) parallel to y-axis

C) passing through origin D) passing through (0, 11).

10. Find the value of $\cos 60^\circ \sin 30^\circ + \cos 30^\circ \sin 60^\circ$ is _____

A) $-1$ B) $\sqrt{2}$ C) 1 D) $\frac{1}{\sqrt{2}}$

11. If the volume and surface area of a sphere are numerically equal, then the radius of the sphere is _____

A) 2 B) 3 C) 4 D) $\frac{4}{3}$

12. If the radius of the base of a cone is equal tripled and the height is doubled then the volume is

A) made 6 times B) made 18 time

C) made 12 times D) unchanged.

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

A) 40000 B) 160900 C) 160000 D) 30000.

14. Kamalam went to play a lucky draw contest. 135 tickets of the lucky draw 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 10 questions. $10 \times 2 = 20$

Question No. 28 is compulsory.

15. If $A \times B = \{(3,2), (3,4), (5,2), (5,4)\}$ then find A and B.

16. Let f be a function from R to R defined by $f(x) = 3x - 5$. Find the values of a and b given that $(a, 4)$ and $(1, b)$ belong to f.

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

18. If $1^3 + 2^3 + 3^3 + \cdots + k^3 = 44100$ then find $1 + 2 + 3 + \cdots + k$.

19. Find LCM of $2x^2 - 5x - 3$, $4x^2 - 36$

20. Solve: $x^4 - 13x^2 + 42 = 0$.

21. A has 'a' rows and a+3 columns, B has 'b' rows and '17-b' columns, and if both product AB and BA exist, find a, b ?

22. Write the statement of Menelaus Theorem.

23. Find the slope of a line joining pts $\left(-\frac{1}{3}, \frac{1}{2}\right)$ and $\left(\frac{2}{7}, \frac{3}{7}\right)$.

24. Find the equation of a line whose intercepts x and y axes are $-5$, $3/4$.

25. prove that $\tan^4\theta + \tan^2\theta = \sec^4\theta - \sec^2\theta$.

26. The radius of a sphere increases by 25%. Find the percentage increases in its surface area.

27. If $n=5$, $\bar{x}=6$, $\Sigma x^2 = 765$, then Calculate the coefficient of variation.

28. A solid sphere and a solid hemisphere have equal total surface area. then find the ratio of their volume.

## PART-III

Answer any 10 questions $10 \times 5 = 50$

Question No. 42. is compulsory.

29. let $f: A \to B$ 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.

30. If $X = \{-5, 1, 3, 4\}$ and $Y = \{a, b, c\}$, then which of the following relations are functions from X to Y?
(i) $R_1 = \{(-5, a), (1, a), (3, b)\}$
(ii) $R_2 = \{(-5, b), (1, b), (3, a), (4, c)\}$
iii) $R_3 = \{(-5, a), (1, a), (3, b), (4, c) (1, b)\}$

31. The $13^{th}$ 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. Find the sum to $n$ terms of the series $7+77+777+\ldots$

33. A flock of swans contained $x^2$ members. As the clouds gathered, $10x$ went to a lake and one-eight of the members flew away to a garden. The remaining three pairs played about in the water. How many swans were there in total?

34. If $A=\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and $I=\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ show that

$A^2-(a+d)A=(bc-ad)I_2$.

35. P and Q are the mid-points of the sides CA and CB respectively of a $\Delta ABC$, right angled at C. Prove that $4(AQ^2+BP^2)=5AB^2$.

36. Show that the given points form a right angled triangle and check whether they satisfies Pythagoras theorem $A(1,-4)$, $B(2,-3)$ and $C(4,-7)$.

37. Find the equation of a straight line through the point of intersection of the lines $8x+3y=18$, $4x+5y=9$ and bisecting the line segment joining the points $(5,-4)$ and $(-7,6)$.

38. A pole 5m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point 'A' on the ground is $60^\circ$ and the angle of depression to the point 'A' from the top of the tower is $45^\circ$. Find the height of the tower. ($\sqrt{3}=1.732$).

39. The volume of a cylindrical water tank is $1.078 \times 10^6$ litres. If the diameter of the tank is 7m. find its height.

40. 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.

41. Two dice are rolled. Find the probability that the sum of outcomes is (i) equal to 6 ii) greater than 9 iii) equal to 13.

42. A solid sphere of radius 6cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5cm and its height is 32cm, then find the thickness of the cylinder.

## PART-IV

Answer all the questions. $2 \times 8 = 16$

43. a) Construct a triangle $\Delta PQR$ such that $QR = 5cm$, $\angle P = 30^\circ$ and the altitude from P to QR is of length is 4.2cm.

(or)

b). Draw a circle of radius 4.5cm. Draw the tangent on the circle using alternate segment theorem.

44. (a) Discuss the nature of solutions of $x^2 + 2x + 5 = 0$

(or)

(b) Draw the graph of $xy = 24$, $x, y > 0$ using the graph. Find (i) y when $x = 3$ and (ii) x when $y = 6$.

ALL THE BEST