Ts 10M Tenkasi District Common Examinations Common Half Yearly Examination - December 202

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## Standard 10

Time: 3.00 Hrs.

# MATHEMATICS

Marks: 100

Part - 1	Ĺ
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TOLE.	1)	If there ar	all the questions	. 2. Choos	se the be	st answer		L4×1=	:14
	-,	number of	e 1024 relations elements in B is	from a set ,	$A = \{1, 2\}$	2, 3, 4, 5}	to a set B	, then	the
		a) 3	b) 2		c) 4		43.0		

2) If  $f : A \rightarrow B$  is a constant function, then the range of f will have

3)  $7^{4k} \equiv \underline{\hspace{1cm}} \pmod{100}$ 

c) 3 d) 4

4) For the given matrix  $\begin{vmatrix} 2 & 4 & 6 & 8 \end{vmatrix}$  the order of the matrix  $A^T$  is 9 11 13 15

a) 2×3

5)  $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$  is \_\_\_\_\_

6) Two poles of heights 6m and 11m stand vertically on a plane ground. If the

distance between their feet is 12m, what is the distance between their tops? a) 13m b) 14m c) 15m d) 12-17. The slope of the line joining (12, 3), (4, a) is 1/8. The value of 'a' is 3/12. c) 15m d) 12.8m

c) -5 d) 2

8) When proving that a quadrilateral is a trapezium, it is necessary to show a) Two sides are parallel

b) Two parallel and two non-parallel sides b) Two parallel and two non-paralled d) All sides are of equal length c) Opposite sides are parallel

9) If the ratio of the height of a tower and the length of its shadow is  $\sqrt{3}:1$ , then the angle of elevation of the sun has measure a) 45° b) 30°

10) If  $5x = \sec \theta$  and  $\frac{5}{x} = \tan \theta$ , then  $x^2 - \frac{1}{x^2}$  is equal to \_\_\_\_\_

b) 1/25 c) 5

11) The total surface area of a hemi-sphere is how much times the square of its radius

b) 4π c)  $3\pi$ 

12) The ratio of the volumes of a cylinder a cone and a sphere, if each has the same 

a) 1:2:3 D) 2:1:3

The sum of all deviations of the date from its mean is \_\_\_\_\_.

b) always negative c) zero d) non-zero integer

14) The probability of an impossible event is \_\_\_\_\_ a) 1 b) 0 c) 1/2 d) -1 (//...//) Part - II (//...//) (//...///) (//...//)

Note: Answer any Ten of the following. Question No. 28 is compulsory.  $10 \times 2 = 20$ 

15) If  $A = \{1, 3, 5\}$  and  $B = \{2, 3\}$  then find  $A \times B$  and  $B \times A$ .

16) Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5

17) Find the LCM of the given expression  $p^2-3p+2$ ,  $p^2-4$ .

18) Determine the nature of the roots for the given quadratic equation  $\sqrt{2}t^2 - 3t + 3\sqrt{2} = 0$ 

19) Define Scalar Matrix with an example.

20) If the three points (3, -1), (a, 3) and (1, -3) are collinear. Find the value of a.

21) Find the equation of a line which passes through (5, 7) and makes intercepts on the axes equal in magnitude but opposite in sign.

#### **Ts10M**

10 th Mathematics

- 22) Prove that  $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \csc\theta + \cot\theta$ .
- 23) The radius of a spherical balloon increases from 12 cm to 16 cm as air being pumped into it. Find the ratio of the surface area of the balloons in two cases.
- 24) The volume of two cones of same base radius are 3600 cm<sup>3</sup> and 5040 cm<sup>3</sup>. Find the ratio of heights.
- 25) Find the range and coefficient of range of 63, 89, 98, 125, 79, 108, 117, 68.
- 26) Find the standard deviation of first 21 natural numbers.
- 27) Two coins are tossed together. What is the probability of getting different faces on the coins?
- 28) What length of ladder is needed to reach a height of 7 ft along the well when the base of the ladder is 4 ft from the wall? Round off your answer to the next tenth place.

## Part - III

Note: Answer any Ten of the following. 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) Find the sum to n terms of the series 3+33+333+...... to n terms.
- 31) The sum of first n, 2n and 3n terms of an A.P are  $S_1$ ,  $S_2$  and  $S_3$  respectively. Prove that  $S_3 = 3(S_2 - S_1)$ .
- 32) State and prove Basic Proportionality Theorem (BPT).
- 33) Find the area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12)and (-4, 3).
- 34) 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).
- 35) From the top of a tower 50m high the angles of depression of the top and bottom of a tree are observed to be 30° and 45° respectively. Find the height of the tree.
- 36) A right circular cylindrical container of base radius 6 cm and height 15 cm is full of ice cream. The ice cream is to be filled in cones of height 9 cm and base radius 3 cm having a hemispherical cap. Find the number of cones needed to empty the container.
- 37) Find the coefficient of variation of 24, 26, 33, 37, 29, 31.
- 38) A card is drawn from a pack of 52 cards. Find the probability of getting a king or a heart or a red card.
- 39) Find the values of m and n if the following polynomial is a perfect square  $x^4 - 8x^3 + mx^2 + nx + 16$ .
- 40) Show that the matrices  $A = \begin{bmatrix} 1 & 2 \\ 3 & 1 \end{bmatrix}$ ,  $B = \begin{bmatrix} 1 & -2 \\ -3 & 1 \end{bmatrix}$  satisfy commutative property
- 41) Find the number of coins, 1.5 cm in diameter and 2mm thick, to be melted to form a right circular cylinder of height 10 cm and diameter 4.5 cm.
- 42) If f(x) = 2x+3; g(x) = 1-2x and h(x) = 3x. Prove that fo(goh) = (fog)oh.

### Part - IV

Note: Answer all the questions.

2×8=16

43) a) Construct a triangle similar to a given triangle ABC with its sides equal to 6/5

of the corresponding sides of the triangle ABC. (Scale factor  $\frac{6}{5} > 1$ ). Si Ram(OR) Matric HES, Vallam

b) Draw a circle of radius 4 cm. At a point L on it draw a tangent to the circle using the alternate segment. Ten kess Dist 627859.

44) a) A two wheeles parking zone near bus stand charges as below:

Time (in hours) (x)	4	8	12	24
Amount ₹ (y)	60	120	180	360
Charling	00	120	180	360

Check if the amount charged are in direct variation or in inverse variation to the parking time. Graph the data. Also (i) Find the amount to be paid when parking time is 6 hr. (ii) Find the parking duration when the amount paid is ₹ 150. (OR)

b) Discuss the nature of solutions of the quadratic equation  $x^2-8x+16=0$ .