

Tsi10M

Tenkasi District

Common Half Yearly Examination - 2024



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Standard 10
MATHEMATICS

Time: 3.00 Hours

Marks: 100

Part - A**I. Choose the correct answer.****14x1=14**

- 1) $A = \{a, b, p\}$, $B = \{2, 3\}$, $C = \{p, q, r, s\}$ then $n[(A \cup C) \times B]$ is
 a) 8 b) 20 c) 12 d) 16
- 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 16th term is m , then the sum of all the terms
 a) $16m$ b) $62m$ c) $31m$ d) $\frac{31}{2}m$
- 4) In an A.P., the first term is 1 and the common difference is 4. How many terms of A.P must be taken for their sum to be equal to 120?
 a) 6 b) 7 c) 8 d) 9
- 5) $\frac{3y-3}{y} + \frac{7y-7}{3y^2}$ is
 a) $\frac{9y}{7}$ b) $\frac{9y^3}{(21y-21)}$ c) $\frac{21y^2-42y+21}{3y^3}$ d) $\frac{7(y^2-2y+1)}{y^2}$
- 6) Graph of a linear equation is a
 a) straight line b) circle c) parabola d) hyperbola
- 7) How many tangents can be drawn to the circle from an exterior point?
 a) one b) two c) infinite d) zero
- 8) The equation of a line passing through the origin and perpendicular to the line $7x-3y+4=0$ is
 a) $7x-3y+4=0$ b) $3x-7y+4=0$ c) $3x+7y=0$ d) $7x-3y=0$
- 9) $(2, 1)$ is the point of intersection of two lines
 a) $x-y-3=0$; $3x-y-7=0$ b) $x+y=3$, $3x+y=7$
 c) $3x+y=3$; $x+y=7$ d) $x+3y-3=0$; $x-y-7=0$
- 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) $(1 + \tan \theta + \sec \theta)(1 + \cot \theta - \operatorname{cosec} \theta)$ is equal to
 a) 0 b) 1 c) 2 d) -1
- 12) The height of a right circular cone whose radius is 5cm and slant height is 13cm will be
 a) 12cm b) 10cm c) 13cm d) 5cm
- 13) The range of the data 8, 8, 8, 8 is
 a) 0 b) 1 c) 8 d) 3
- 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) $9P+15$

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- 35) State and prove Basic proportionality theorem
- 36) Find the equation of the perpendicular bisector of the line joining the points A(-4, 2) and B(6, -4)
- 37) A lift in a building of height 90 feet with transparent glass walls is descending from the top of the building. At the top of the building, the angle of depression to a fountain in the garden is 60° . Two minutes later, the angle of depression reduces to 30° . If the fountain is $30\sqrt{3}$ feet from the entrance of the lift, find the speed of the lift which is descending.
- 38) The radius and height of a cylinder are in the ratio 5 : 7 and its curved surface area is 5500 sq.cm. Find its radius and height.
- 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 3cm and its length is 12 cm. If each cone has a height of 2cm, find the volume of the model that Nathan made.
- 40) Find the coefficient of variation of 24, 26, 33, 37, 29, 31
- 41) Two dice are rolled. Find the probability that the sum of outcomes is
- equal to 4
 - greater than 10
 - less than 13
- 42) Find the area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12) and (-4, 3)

Part - D

IV. Answer all the questions.

2x8=16

- 43) Draw a circle of radius 5cm from a point, which is 10 cm away from its centre. Draw the two tangents to the circle, measure their length

(OR)

Construct a ΔPQR such that $QR = 5\text{cm}$, $\angle P = 30^\circ$ and the altitude from P to QR is of length 4.2cm

- 44) A company initially started with 40 workers to complete the work by 150 days. Later it decided to fasten up the work increasing the number of workers as shown below

Number of worker (x)	40	50	60	75
Number of days(y)	150	120	100	80

- Graph the above data and identify the type of variation
- From the Graph, Find the number of days required to complete the work if the company decides to opt for 120 workers?
- If the work has to be completed by 30 days, how many workers are required?

(OR)

Graph the quadratic equation $y = x^2 - 5x - 6$ and hence solve the quadratic equation $x^2 - 5x - 14 = 0$
