Tsi10M

Tenkasi District

Common Half Yearly Examination - December 2025

Standard 10

MATHS

PART - A

Angel Matriculation School
33/5 Indira Nagar
Sankarankovil – 627756
Tenkasi – District

Time: 3.00 Hours Marks: 100

I. Choose the correct answer: **14×1=14**

1) The range of the relation R = {(x, x^2)/x is a prime number less than 13} is
   a) {2, 3, 5, 7} b) {2, 3, 5, 7, 11}
   c) {4, 9, 25, 49, 121} d) {1, 4, 9, 25, 49, 121}

2) If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then fog is
   a) $\frac{3}{2x^2}$ b) $\frac{2}{3x^2}$ c) $\frac{2}{9x^2}$ d) $\frac{1}{6x^2}$

3) If the HCF of 65 and 117 is expressible in the form of 65 m –117, then the value of m is
   a) 4 b) 2 c) 1 d) 3

4) The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots\ldots$ is
   a) $\frac{1}{24}$ b) $\frac{1}{27}$ c) $\frac{2}{3}$ d) $\frac{1}{81}$

5) 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) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$

6) Graph of a linear equation is a _____
   a) straight line b) circle c) parabola d) hyperbola

7) If in a ΔABC, DE || BC, AB = 3.6 cm, AC = 2.4 cm and AD = 2.1 cm then the length of AE is _____
   a) 1.4 cm b) 1.8 cm c) 1.2 cm d) 1.05 cm

8) 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)

9) The x-intercept of the line 2x–y = 10 is
   a) 5 b) 10 c) –10 d) not defined

10) cos (90–θ) =
   a) sec θ b) sin θ c) cos θ d) cosec θ

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 total surface area of a cylinder whose radius is 1/3 of its height is
   a) $\frac{9\pi h^2}{8}$ sq.units b) $24\pi h^2$ sq.units c) $\frac{8\pi h^2}{9}$ sq.units d) $\frac{56\pi h^2}{9}$ sq.units

13) The ratio of the volumes of a cylinder, a cone and a sphere, if each has the same diameter and same height is
   a) 1:2:3 b) 2:1:3 c) 1:3:2 d) 3:1:2

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 - B

II. Do the questions given below: (any 10) Q.No. 28 is compulsory: **10×2=20**

15) Let A = {1, 2, 3} and B = {x / x is a prime no. less than 10} Find A×B and B×A
16) Show that the function f:N→N defined by f(x) = 2x–1 is one-one but not onto.
17) If $13824 = 2^a \times 3^b$ then find a and b
18) Find the sum of $1^3+2^3+3^3+\ldots..+16^3$
19) Multiply $\frac{x^4b^2}{x-1}$ by $\frac{x^2-1}{a^4b^3}$

20) What length of ladder is needed to reach a height of 7 ft along the wall when the base of the ladder is 4 ft from the wall?
21) Find the slope of a line joining the points $(5, \sqrt{5})$ with origin
22) Find the intercepts made by the line $4x-9y+36 = 0$ on the coordinate axes.
23) Prove the identify: $\frac{\cos\theta}{1+\sin\theta} = \sec\theta - \tan\theta$
24) A player sitting on the top of a tower of height 20 m observe the angle of depression of a ball lying on the ground as 60°. Find the distance between the foot of the tower and the ball. $(\sqrt{3} = 1.732)$
25) If the total surface area of a cone of radius 7 cm is 704 cm^2 then find its slant height.
26) An aluminium sphere of radius 12 cm is melted to make a cylinder of radius 8 cm. Find the height of cylinder.
27) The range and smallest value of a set of a data are 36.8 and 13.4, find the largest value.
28) Is it possible to design a rectangular park of perimeter 320 m and area 4800 m^2. If so, find its length and breadth.

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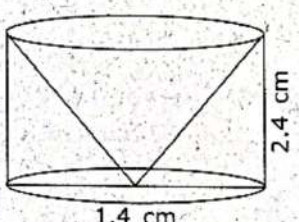
PART - C

III. Do any 10 of the following sums with steps. Q.No. 42 is compulsory. 10×5=50

29) Let $A = \{x \in w / x < 2\}$, $B = \{x \in N / 1 < x \leq 4\}$, $C = \{3, 5\}$ verify that $A\times(B\cap C) = (A\times B)\cap(A\times C)$
30) 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 the function (i) by arrow diagram (ii) in table (iii) as set of ordered pairs (iv) in a graphical form.
31) Find the sum of all natural numbers between 300 and 600 which are divisible by 7.
32) Find the sum to 'n' terms of the series $0.4+0.44+0.444+\ldots\ldots+0$ n terms.
33) If $9x^4+12x^3+28x^2+ax+b$ is a perfect square then find a and b
34) If $A = \begin{matrix} 3 & 1 \\ -1 & 2 \end{matrix}$ show that $A^2-5A+7I_2 = 0$
35) State and prove basic proportionality theorem.
36) Find the area of the quadrilateral whose vertices are (−9, 0) (−8, 6) (−1, −2) and (−6, −3)
37) Find the equation of the perpendicular bisector of the line joining the points A(−4, 2) and B(6, −4)
38) Two ships are sailing in the sea on either side of the light house. The angle of elevation of the top of the light house as observed from the ships are 30° and 45° respectively. If the light house is 200 m high, find the distance between the two ships. $(\sqrt{3} = 1.732)$
39) If the radii of the circular ends of a frustum which is 45 cm high are 28 cm and 7 cm, find the volume of the frustum.
40) Find the coefficient of variation of 24, 26, 33, 37, 29, 31.
41) A coin is tossed thrice. What is the probability of getting two consecutive tails?
42) From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and base is hollowed out. Find the total surface area of the remaining solid.



PART - D

IV. Do the following: 2×8=16

43) a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{4}$ of the corresponding sides of the triangle PQR (scale factor $\frac{7}{4} > 1$) **(OR)**
b) Construct a ΔPQR in which the base PQ = 4.5 cm, ∠R = 35° and the median RG from R to PQ is 6 cm.
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) Graph the quadratic equations $x^2-6x+9=0$ and state their nature of solutions.

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