

MODEL QUESTION PAPER - மாதிரி வினாத்தாள்-2

10th Standard EM

MATHS - A

Reg.No. :

Use Blue or Black pen only

Note : This question paper contains four parts

Time : 02:30:00 Hrs

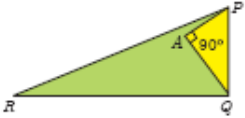
Total Mark : 100

14 x 1 = 14

PART - I (MARKS : 14)

I. CHOOSE THE MOST SUITABLE ANSWER:

- Let $n(A) = m$ and $n(B) = n$ then the total number of non-empty relations that can be defined from A to B is
 (a) m^n (b) n^m (c) $2^{mn}-1$ (d) 2^{mn}
- If $g = \{(1,1), (2,3), (3,5), (4,7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the values of α and β are
 (a) $(-1,2)$ (b) $(2,-1)$ (c) $(-1,-2)$ (d) $(1,2)$
- The first term of an arithmetic progression is unity and the common difference is 4. Which of the following will be a term of this A.P.
 (a) 4551 (b) 10091 (c) 7881 (d) 13531
- The solution of $(2x - 1)^2 = 9$ is equal to
 (a) -1 (b) 2 (c) -1, 2 (d) None of these
- For the given matrix $A = \begin{pmatrix} 1 & 3 & 5 & 7 \\ 2 & 4 & 6 & 8 \\ 9 & 11 & 13 & 15 \end{pmatrix}$ the order of the matrix A^T is
 (a) 2×3 (b) 3×2 (c) 3×4 (d) 4×3
- In the given figure $PR = 26$ cm, $QR = 24$ cm, $\angle PAQ = 90^\circ$, $PA = 6$ cm and $QA = 8$ cm Find $\angle PQR$



- 80° (b) 85° (c) 75° (d) 90°
- How many tangents can be drawn to the circle from an exterior point?
 (a) one (b) two (c) infinite (d) zero
- If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then the slope of the perpendicular bisector of PQ is
 (a) $\sqrt{3}$ (b) $-\sqrt{3}$ (c) $\frac{1}{\sqrt{3}}$ (d) 0
- $(2, 1)$ 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) $x + 3y - 3 = 0$; $x - y - 7 = 0$
- $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to
 (a) $\sec\theta$ (b) $\cot^2\theta$ (c) $\sin\theta$ (d) $\cot\theta$
- 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° (c) 90° (d) 60°
- If $\sin\theta - \cos\theta = 0$, then the value of $(\sin^4\theta + \cos^4\theta)$ is
 (a) 1 (b) $\frac{3}{4}$ (c) $\frac{1}{2}$ (d) $\frac{1}{4}$
- The mean of 100 observations is 40 and their standard deviation is 3. The sum of squares of all deviations is
 kindly send me your key Answers to our email id - padasalai.net@gmail.com

- (a) 40000 (b) 160000 (c) 160000 (d) 30000

14) If the mean and coefficient of variation of a data are 4 and 87.5% then the standard deviation is

- (a) 3.5 (b) 3 (c) 4.5 (d) 2.5

PART - II (MARKS : 20)

10 x 2 = 20

II. ANSWER TEN QUESTIONS. QUESTION 28 IS COMPULSORY

15) Represent the function $f(x) = \sqrt{2x^2 - 5x + 3}$ as a composition of two functions.

16) Find k if $f \circ g(k) = 5$ where $f(k) = 2k - 1$.

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

18) Find the least positive value of x such that

$$98 \equiv (x + 4) \pmod{5}$$

19) Find $\frac{x^2+20x+36}{x^2-3x-28} - \frac{x^2+12x+4}{x^2-3x-28}$

20) Consider the following information regarding the number of men and women workers in three factories I, II and III.

Factory	Men	Women
I	23	18
II	47	36
III	15	16

Represent the above information in the form of a matrix. What does the entry in the second row and first column represent?

21) If α, β are the roots of the equation $2x^2 - x - 1 = 0$, then form the equation whose roots are

$$2\alpha + \beta, 2\beta + \alpha$$

22) An insect 8 m away initially from the foot of a lamp post which is 6 m tall, crawls towards it moving through a distance. If its distance from the top of the lamp post is equal to the distance it has moved, how far is the insect away from the foot of the lamp post?

23) Find the area of the quadrilateral formed by the points (8, 6), (5, 11), (-5, 12) and (-4, 3).

24) A mobile phone is put to use when the battery power is 100%. The percent of battery power 'y' (in decimal) remaining after using the mobile phone for x hours is assumed as $y = -0.25x + 1$



Draw a graph of the equation.

25) if $\operatorname{cosec}\theta + \cot\theta = p$, then prove that $\cos\theta = \frac{p^2 - 1}{p^2 + 1}$

26) An industrial metallic bucket is in the shape of the frustum of a right circular cone whose top and bottom diameters are 10 m and 4 m and whose height is 4 m. Find the curved and total surface area of the bucket.



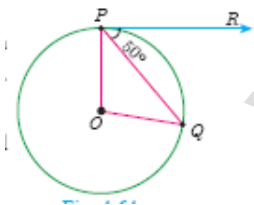
- 27) The amount of rainfall in a particular season for 6 days are given as 17.8 cm, 19.2 cm, 16.3 cm, 12.5 cm, 12.8 cm and 11.4 cm. Find its standard deviation.
- 28) A game of chance consists of spinning an arrow which is equally likely to come to rest pointing to one of the numbers 1, 2, 3, ...12. What is the probability that it will point to (i) 7 (ii) a prime number (iii) a composite number?

PART - III (MARKS : 50)

10 x 5 = 50

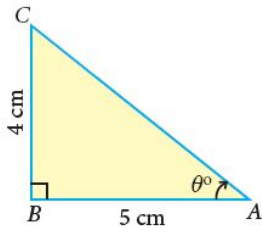
III. ANSWER TEN QUESTIONS. QUESTION 42 IS COMPULSORY

- 29) Let $A = \{1,2,3,4\}$ and $B = \{2,5,8,11,14\}$ be two sets. Let $f: A \rightarrow B$ be a function given by $f(x)=3x-1$. Represent this function
- by arrow diagram
 - in a table form
 - as a set of ordered pairs
 - in a graphical form
- 30) Let f be a function from R to R defined by $f(x)=x-5$. Find the values of a and b given that $(a,4)$ and $(1,b)$ belong to f .
- 31) Find the least positive integer n such that $1 + 6 + 6^2 + \dots + 6^n > 5000$
- 32) Solve $3p^2 + 2\sqrt{5}p - 5 = 0$ by formula method.
- 33) If $A = \begin{bmatrix} 5 & 4 & -2 \\ \frac{1}{2} & \frac{3}{4} & \sqrt{2} \\ 1 & 9 & 4 \end{bmatrix}$, $B = \begin{bmatrix} -7 & 4 & -3 \\ \frac{1}{4} & \frac{7}{2} & 3 \\ 5 & -6 & 9 \end{bmatrix}$, find $4A - 3B$.
- 34) Find the values of ' k ' such that quadratic equation $(k + 9)x^2 + (k+1)x + 1 = 0$ has no real roots?
- 35) In Fig.O is the centre of a circle. PQ is a chord and the tangent PR at P makes an angle of 50° with PQ. Find $\angle POQ$,



- 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) calculate the size of $\angle BAC$ in the given triangles



38) If $\angle ATB = 90^\circ$ then prove that

$$\sqrt{\frac{\tan A}{\sin A} \frac{\tan B + \tan A}{\sec B} \frac{\cot B}{\cos^2 A}} = \tan A$$

39) The volume of a solid hemisphere is 29106 cm^3 . Another hemisphere whose volume is two-third of the above is carved out. Find the radius of the new hemisphere.

40) A metallic sphere of radius 16 cm is melted and recast into small spheres each of radius 2 cm. How many small spheres can be obtained?

41) The consumption of number of guava and orange on a particular week by a family are given below.

Number of Guavas	3	5	6	4	3	5	4
Number of Oranges	1	3	7	9	2	6	2

Which fruit is consistently consumed by the family?

42) In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at random. Find the probability that

- (i) The student opted for NCC but not NSS.
- (ii) The student opted for NSS but not NCC.
- (iii) The student opted for exactly one of them.

PART - IV (16)

2 x 8 = 16

IV. ANSWER BOTH QUESTIONS

43) a) Graph the following quadratic equations and state their nature of solutions.

$$x^2 + x + 7 = 0$$

(OR)

b) Graph the following quadratic equations and state their nature of solutions.

$$(2x - 3)(x + 2) = 0$$

44) a) Construct a $\triangle PQR$ in which $QR = 5 \text{ cm}$, $\angle P = 40^\circ$ and the median PG from P to QR is 4.4 cm . Find the length of the altitude from P to QR .

(OR)

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

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