



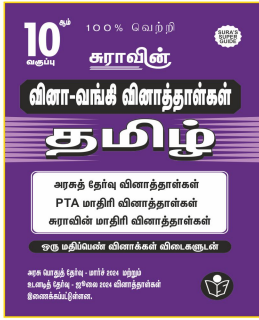
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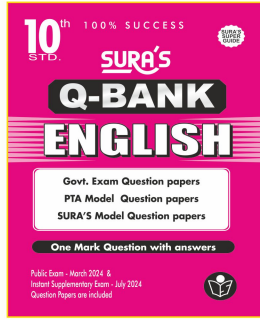
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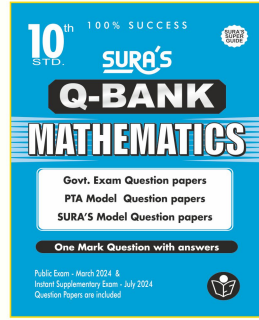
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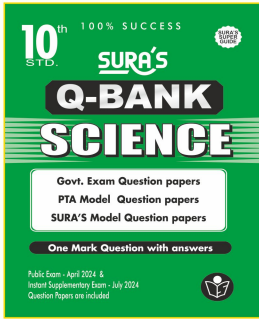
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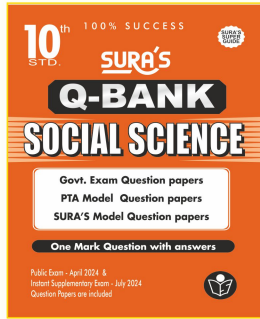
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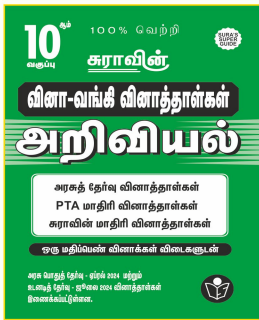
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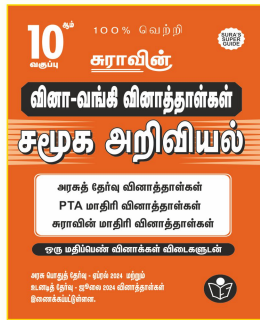
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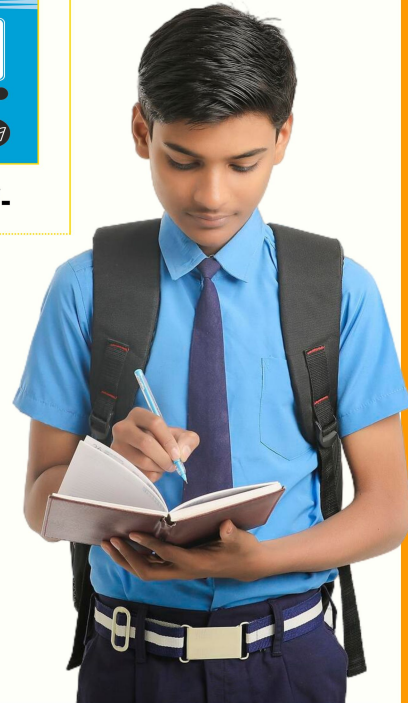


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10th
STD

INSTANT SUPPLEMENTARY EXAM - JULY 2024

Reg. No.

PART - III

Time Allowed : 3.00 Hours]

Mathematics

[Maximum Marks : 100

- Instructions :** (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
(2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams.

Note : This question paper contains **four** parts.

Part - I

- Note :** (i) Answer **all** the questions. **14 × 1 = 14**
(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

- If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$, then $f \circ g$ is :
(a) $\frac{3}{2x^2}$ (b) $\frac{2}{3x^2}$ (c) $\frac{2}{9x^2}$ (d) $\frac{1}{6x^2}$
- If $\{(a, 8), (6, b)\}$ represents an identity function, then the value of a and b are respectively :
(a) (8,6) (b) (8,8) (c) (6,8) (d) (6,6)
- $7^{4k} \equiv \underline{\hspace{2cm}}$ (mod 100)
(a) 1 (b) 2 (c) 3 (d) 4
- $\frac{x}{x^2 - 25} - \frac{8}{x^2 + 6x + 5}$ gives :
(a) $\frac{x^2 - 7x + 40}{(x-5)(x+5)}$ (b) $\frac{x^2 + 7x + 40}{(x-5)(x+5)(x+1)}$ (c) $\frac{x^2 - 7x + 40}{(x^2 - 25)(x+1)}$ (d) $\frac{x^2 + 10}{(x^2 - 25)(x+1)}$
- Transpose of a column matrix is :
(a) unit matrix (b) diagonal matrix (c) column matrix (d) row matrix
- Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?
(a) 13 m (b) 14 m (c) 15 m (d) 12.8 m
- A tangent is perpendicular to the radius at the :
(a) centre (b) point of contact (c) infinity (d) chord
- The straight line given by the equation $x = 11$ is :
(a) Parallel to X - axis (b) Parallel to Y - axis
(c) Passing through the origin (d) passing through the point (0,11)
- 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) $7x - 3y = 0$
- $\tan \theta \operatorname{cosec}^2 \theta - \tan \theta$ 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°
- The height of a right circular cone whose radius is 5 cm and slant height is 13 cm will be :
(a) 12 cm (b) 10 cm (c) 13 cm (d) 5 cm

[3]

13. Which of the following is incorrect?

- (a) $P(A) > 1$ (b) $0 \leq P(A) \leq 1$ (c) $P(\phi) = 0$ (d) $P(A) + P(\bar{A}) = 1$

14. The range of the data 8, 8, 8, 8, 8,....., 8 is :

- (a) 0 (b) 1 (c) 8 (d) 3

Part - II

Note : Answer any 10 questions. Question No.28 is compulsory.

10 × 2 = 20

15. If $B \times A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)\}$ find A and B.

16. Given $f(x) = 2x - x^2$

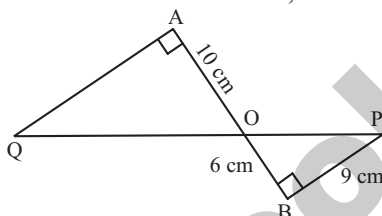
Find (i) $f(1)$ (ii) $f(x+1)$

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

18. Find the LCM of $9a^3b^2$, $12a^2b^2c$.

19. Determine the nature of the roots for the following quadratic equation $15x^2 + 11x + 2 = 0$.

20. In figure QA and PB are perpendiculars to AB. If AO = 10 cm, BO = 6 cm and PB = 9 cm, find AQ.



21. The line 'p' passes through the points (3, -2), (12, 4) and the line 'q' passes through the points (6, -2) and (12, 2). Is 'p' parallel to 'q'?

22. Find the slope of the straight line $6x + 8y + 7 = 0$.

23. Prove the following identity $\frac{1 - \tan^2 \theta}{\cot^2 \theta - 1} = \tan^2 \theta$

24. A cylindrical drum has a height of 20 cm and base radius of 14 cm. Find its curved surface area.

25. The volumes of two cones of same base radius are 3600 cm^3 and 5040 cm^3 . Find the ratio of heights.

26. Find the standard deviation of first 21 natural numbers.

27. A coin is tossed thrice. What is the probability of getting two consecutive tails?

28. Which term of an A.P. 16, 11, 6, 1, ... is -54 ?

Part - III

Note : Answer any 10 questions. Question No.42 is compulsory.

10 × 5 = 50

29. Let A = The set of all natural numbers less than 8, B = The set of all prime numbers less than 8, C = The set of even prime number. Verify that $(A \cap B) \times C = (A \times C) \cap (B \times C)$.

30. A function $f: [-5, 9] \rightarrow \mathbb{R}$ is defined as follows:

$$f(x) = \begin{cases} 6x + 1; & -5 \leq x < 2 \\ 5x^2 - 1; & 2 \leq x < 6 \\ 3x - 4; & 6 \leq x \leq 9 \end{cases}$$

Find (i) $f(-3) + f(2)$ (ii) $f(7) - f(1)$

(iii) $2f(4) + f(8)$ (iv) $\frac{2f(-2) - f(6)}{f(4) + f(-2)}$

31. Find the sum to 'n' terms of the series

$3 + 33 + 333 + \dots$ to n terms.

32. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square, find the values of 'a' and 'b'.

33. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm,....., 24 cm. How much area can be decorated with these colour papers?
34. If $A = \begin{pmatrix} 5 & 2 & 9 \\ 1 & 2 & 8 \end{pmatrix}$ $B = \begin{pmatrix} 1 & 7 \\ 1 & 2 \\ 5 & -1 \end{pmatrix}$ verify that $(AB)^T = B^T A^T$.
35. State and prove Pythagoras Theorem.
36. Find the area of the quadrilateral whose vertices are at $(-9, 0)$, $(-8, 6)$, $(-1, -2)$ and $(-6, -3)$
37. Find the equation of a straight line through the intersection of lines $7x + 3y = 10$, $5x - 4y = 1$ and parallel to the line $13x + 5y + 12 = 0$.
38. A pole 5 m 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° and the angle of depression to the point 'A' from the top of the tower is 45° . Find the height of the tower. ($\sqrt{3} = 1.732$)
39. 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?
40. A teacher asked the students to complete 60 pages of a record note book. Eight students have completed only 32, 35, 37, 30, 33, 36, 35 and 37 pages. Find the standard deviation of the pages completed by them.
41. Two dice are rolled. Find the probability that the sum of outcome is (i) equal to 4 (ii) greater than 10 (iii) less than 13.
42. The internal and external diameters of a hollow hemispherical vessel are 20 cm and 28 cm respectively. Find the cost to paint the vessel all over at ₹ 0.14 per cm^2 .

Part - IV

Note : Answer all the questions.

2 × 8 = 16

43. (a) Draw the two tangents from a point which is 10 cm away from the centre of a circle of radius 5 cm. Also, measure the lengths of the tangents.
- (OR)
- (b) Construct a ΔPQR in which $QR = 5$ 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 .
44. (a) The following table shows the data about the number of pipes and the time taken to fill the same tank.

| | | | | |
|-----------------------------|----|----|----|----|
| No. of pipes (x) | 2 | 3 | 6 | 9 |
| Time Taken (in min) (y) | 45 | 30 | 15 | 10 |

Draw the graph for the above data and hence :

- (i) Find the time taken to fill the tank when five pipes are used
- (ii) Find the number of pipes when the time is 9 minutes.

(OR)

- (b) Draw the graph of $y = x^2 + x - 2$ and hence solve $x^2 + x - 2 = 0$.



10th
STD**PUBLIC EXAMINATION - APRIL 2024**

Reg. No.

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PART - III**Mathematics****Time Allowed : 3.00 Hours]****[Maximum Marks : 100**

- Instructions :** (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.
- (2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams.

Note : This question paper contains **four** parts.

Part - I

- Note :** (i) Answer **all** the questions **14 × 1 = 14**
- (ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

- If $n(A \times B) = 6$ and $A = \{1, 3\}$, then $n(B)$ is :
(a) 1 (b) 2 (c) 3 (d) 6
- If $f: A \rightarrow B$ is a bijective function and if $n(B) = 7$, then $n(A)$ is equal to :
(a) 7 (b) 49 (c) 1 (d) 14
- The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is :
(a) 2025 (b) 5220 (c) 5025 (d) 2520
- An A.P. consists of 31 terms. If its 16th term is m , then the sum of all the terms of this A.P. is :
(a) $16m$ (b) $62m$ (c) $31m$ (d) $\frac{31}{2}m$
- Which of the following should be added to make $x^4 + 64$ a perfect square?
(a) $4x^2$ (b) $16x^2$ (c) $8x^2$ (d) $-8x^2$
- Graph of a linear equation is a _____ .
(a) straight line (b) circle (c) parabola (d) hyperbola
- If in $\triangle ABC$, $DE \parallel BC$, $AB = 3.6$ 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
- How many tangents can be drawn to the circle from an exterior point?
(a) One (b) Two (c) Infinite (d) Zero
- The area of triangle formed by the points $(-5, 0)$, $(0, -5)$ and $(5, 0)$ is :
(a) 0 sq. units (b) 25 sq. units (c) 5 sq. units (d) 10 sq. units
- If $x = a \tan \theta$ and $y = b \sec \theta$, then :
(a) $\frac{y^2}{b^2} - \frac{x^2}{a^2} = 1$ (b) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ (c) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (d) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 0$
- The curved surface area of a right circular cylinder of height 4 cm and base diameter 10 cm is :
(a) 40π sq. units (b) 20π sq. units (c) 14π sq. units (d) 80π sq. units
- 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
- Which of the following values cannot be a probability of an event?
(a) 0 (b) 0.5 (c) 1.05 (d) 1
- The probability of getting a job for a person is $\frac{x}{3}$. If the probability of not getting the job is $\frac{2}{3}$, then the value of x is :
(a) 2 (b) 1 (c) 3 (d) 1.5

[6]

Part - II

Note : Answer any 10 questions. Question No.28 is compulsory.

10 × 2 = 20

15. If $A \times B = \{(3, 2), (3, 4), (5, 2), (5, 4)\}$ then find A and B.
16. If $f(x) = 3x - 2$, $g(x) = 2x + k$ and $f \circ g = g \circ f$, then find the value of k .
17. 'a' and 'b' are two positive integers such that $a^b \times b^a = 800$. Find 'a' and 'b'.
18. Simplify : $\frac{4x^2y}{2z^2} \times \frac{6xz^3}{20y^4}$
19. Find the sum and product of the roots for following quadratic equation. $x^2 + 8x - 65 = 0$.
20. A man goes 18 m due East and then 24 m due North. Find the distance of his current position from the starting point.
21. If the points A (-3, 9), B(a, b) and C(4, -5) are collinear and if $a + b = 1$, then find a and b.
22. Find the equation of a straight line which has slope $\frac{-5}{4}$ and passing through the point (-1, 2).
23. Prove that $\sqrt{\frac{1 + \cos \theta}{1 - \cos \theta}} = \operatorname{cosec} \theta + \cot \theta$.
24. If the base area of a hemispherical solid is 1386 sq. metres, then find its total surface area.
25. Find the volume of cylinder whose height is 2 m and base area is 250 sq. m.
26. Find the range and coefficient of range of the following data : 25, 67, 48, 53, 18, 39, 44
27. What is the probability that a leap year selected at random will contain 53 Saturdays?
28. Find the HCF of 23 and 12.

Part - III

Note : Answer any 10 questions. Question No.42 is compulsory.

10 × 5 = 50

29. Let $A = \{x \in \mathbb{N} \mid 1 < x < 4\}$, $B = \{x \in \mathbb{W} \mid 0 \leq x < 2\}$ and $C = \{x \in \mathbb{N} \mid x < 3\}$. Then verify that $A \times (B \cup C) = (A \times B) \cup (A \times C)$.
30. Let $A = \{0, 1, 2, 3\}$ and $B = \{1, 3, 5, 7, 9\}$ be two sets. Let $f : A \rightarrow B$ be a function given by $f(x) = 2x + 1$. Represent this function :
 - (i) by arrow diagram
 - (ii) in a table form
 - (iii) as a set of ordered pairs
 - (iv) in a graphical form
31. Find the sum of $9^3 + 10^3 + \dots + 21^3$.
32. Find the square root of $64x^4 - 16x^3 + 17x^2 - 2x + 1$.
33. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ show that $A^2 - 5A + 7I_2 = 0$.
34. State and prove Thales Theorem.
35. Find the area of quadrilateral whose vertices are at (-9, -2), (-8, -4), (2, 2) and (1, -3).
36. Find the equation of the perpendicular bisector of the line joining the points A(-4, 2) and B(6, -4).
37. Two ships are sailing in the sea on either sides of a lighthouse. The angle of elevation of the top of the lighthouse as observed from the ships are 30° and 45° respectively. If the lighthouse is 200m high, find the distance between the two ships. ($\sqrt{3} = 1.732$).
38. 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.
39. 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.
40. Find the coefficient of variation of 24, 26, 33, 37, 29, 31.
41. Two dice are rolled once. Find the probability of getting an even number on the first die or the total of face sum 8.
42. Find the sum to n terms of the series $7 + 77 + 777 + \dots$

Part - IV

Note : Answer all the questions.

$2 \times 8 = 16$

43. (a) Construct a ΔPQR which the base $PQ = 4.5$ cm, $\angle R = 35^\circ$ and the median RG from R to PQ is 6 cm.

(OR)

- (b) Draw a circle of diameter 6 cm. from a point P , which is 8 cm. away from its centre. Draw the two tangents. PA and PB to the circle and measure their lengths.

44. (a) Draw the graph of $y = 2x^2 - 3x - 5$ and hence solve $2x^2 - 4x - 6 = 0$.

(OR)

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



10th
STD

INSTANT SUPPLEMENTARY EXAM - JUNE - 2023

Reg. No.

PART - III

Time Allowed : 3.00 Hours]

Mathematics

[Maximum Marks : 100

Instructions : (1) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

(2) Use **Blue** or **Black** ink to write and underline and pencil to draw diagrams.

Note : This question paper contains **four** parts.

Part - I

Note : (i) Answer **all** the questions.

14 × 1 = 14

(ii) Choose the most appropriate answer from the given **four** alternatives and write the option code and the corresponding answer.

- If there are 1024 relations from a set $A = \{1, 2, 3, 4, 5\}$ to a set B, then the number of elements in B is :
(a) 3 (b) 2 (c) 4 (d) 8
- $7^{4k} \equiv \underline{\hspace{2cm}} \pmod{100}$
(a) 1 (b) 2 (c) 3 (d) 4
- The next term of the sequence $\frac{1}{2}, \frac{1}{6}, \frac{1}{10}, \frac{1}{14}$... is :
(a) $\frac{1}{15}$ (b) $\frac{1}{16}$ (c) $\frac{1}{18}$ (d) $\frac{1}{20}$
- $y^2 + \frac{1}{y^2}$ is not equal to :
(a) $\frac{y^4+1}{y^2}$ (b) $\left(y + \frac{1}{y}\right)^2$ (c) $\left(y - \frac{1}{y}\right)^2 + 2$ (d) $\left(y + \frac{1}{y}\right)^2 - 2$
- Graph of a linear equation is a _____.
(a) straight line (b) circle (c) parabola (d) hyperbola
- If in $\triangle ABC$, $DE \parallel BC$, $AB = 3.6$ 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
- How many tangents can be drawn to the circle from an exterior point?
(a) one (b) two (c) infinite (d) zero
- The straight line given by the equation $x = 11$ is
(a) parallel to X axis (b) parallel to Y axis
(c) passing through the origin (d) passing through the point (0,11)
- If the 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
- $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to :
(a) $\sec\theta$ (b) $\cot^2\theta$ (c) $\sin\theta$ (d) $\cot\theta$
- The total surface area of a hemisphere is how much times the square of its radius?
(a) π (b) 4π (c) 3π (d) 2π
- The curved surface area of a right circular cone of height 15 cm and base diameter 16 cm is
(a) 60π cm² (b) 68π cm² (c) 120π cm² (d) 136π cm²
- The range of the data 8, 8, 8, 8, 8, ... 8 is :
(a) 0 (b) 1 (c) 8 (d) 3
- The probability a red marble selected at random from a jar containing p red, q blue and r green marbles is
(a) $\frac{q}{p+q+r}$ (b) $\frac{p}{p+q+r}$ (c) $\frac{p+q}{p+q+r}$ (d) $\frac{p+r}{p+q+r}$

[9]

10th
STD**SURA'S MODEL QUESTION PAPER - 5**

Reg. No.

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| | | | | |
|--|--|--|--|--|

Time Allowed : 3.00 Hours]

PART - III
Mathematics

[Maximum Marks : 100

Part - I

- Note :** (1) Answer all the 14 questions. **14 × 1 = 14**
 (2) Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer

- A system of three linear equations in three variables is inconsistent if their planes
 - intersect only at a point
 - intersect in a line
 - coincides with each other
 - do not intersect
- The slope of the line joining (12, 3), (4, a) is $\frac{1}{8}$. The value of 'a' is
 - 1
 - 4
 - 5
 - 2
- 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.
 - 45°
 - 30°
 - 90°
 - 60°
- If there are 1024 relations from a set A = {1, 2, 3, 4, 5} to a set B, then the number of elements in B is
 - 3
 - 2
 - 4
 - 8
- Kamalam went to play a lucky draw contest. 135 tickets of the lucky draw were sold. If the probability of Kamalam winning is $\frac{1}{9}$, then the number of tickets bought by Kamalam is
 - 5
 - 10
 - 15
 - 20
- The sum of the exponents of the prime factors in the prime factorization of 1729 is
 - 1
 - 2
 - 3
 - 4
- Which of the following is incorrect?
 - $P(A) > 1$
 - $0 \leq P(A) \leq 1$
 - $P(\phi) = 0$
 - $P(A) + P(\bar{A}) = 1$
- The range of first 10 prime numbers is
 - 9
 - 20
 - 27
 - 5
- If $\sin \theta = \cos \theta$, then $2 \tan^2 \theta + \sin^2 \theta - 1$ is equal to
 - $-\frac{3}{2}$
 - $\frac{3}{2}$
 - $\frac{2}{3}$
 - $-\frac{2}{3}$

[56]

10. How many tangents can be drawn to the circle from an exterior point?
- (a) one (b) two (c) infinite (d) zero
11. The sum of all deviations of the data from its mean is
- (a) always positive (b) always negative (c) zero (d) non-zero integer
12. 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
13. Find the matrix X if $2X + \begin{bmatrix} 1 & 3 \\ 5 & 7 \end{bmatrix} = \begin{bmatrix} 5 & 7 \\ 9 & 5 \end{bmatrix}$
- (a) $\begin{bmatrix} -2 & -2 \\ 2 & -1 \end{bmatrix}$ (b) $\begin{bmatrix} 2 & 2 \\ 2 & -1 \end{bmatrix}$ (c) $\begin{bmatrix} 1 & 2 \\ 2 & 2 \end{bmatrix}$ (d) $\begin{bmatrix} 2 & 1 \\ 2 & 2 \end{bmatrix}$
14. The excluded value of the rational expression $\frac{x^3 + 8}{x^2 - 2x - 8}$ is
- (a) 8 (b) 2 (c) 4 (d) 1

Part - II

Note : Answer 10 questions. Question No.28 is compulsory.

10 × 2 = 20

15. If A and B are two mutually exclusive events of a random experiment and $P(\text{not } A) = 0.45$, $P(A \cup B) = 0.65$, then find $P(B)$.
16. If $3 + k$, $18 - k$, $5k + 1$ are in A.P. then find k .
17. The product of Kumaran's age (in years) two years ago and his age four years from now is one more than twice his present age. What is his present age?
18. Find the angle of elevation of the top of a tower from a point on the ground, which is 30 m away from the foot of a tower of height $10\sqrt{3}$ m.
19. $1^3 + 2^3 + 3^3 + \dots + k^3 = 16900$, then find $1 + 2 + 3 + \dots + k$.
20. A and B are two candidates seeking admission to IIT. The probability that A getting selected is 0.5 and the probability that both A and B getting selected is 0.3. Prove that the probability of B being selected is at most 0.8.
21. A hemi-spherical hollow bowl has material of volume $\frac{436\pi}{3}$ cubic cm. Its external diameter is 14 cm. Find its thickness.
22. Three fair coins are tossed together. Find the probability of getting
- (i) atleast one tail (ii) atmost one head

23. Find the sum of $1 + 3 + 5 + \dots + 55$.
24. The hill in the form of a right triangle has its foot at $(19, 3)$. The inclination of the hill to the ground is 45° . Find the equation of the hill joining the foot and top.
25. A tower stands vertically on the ground. From a point on the ground, which is 48m away from the foot of the tower, the angle of elevation of the top of the tower is 30° . Find the height of the tower.
26. A cone of height 24 cm is made up of modeling clay. A child reshapes it in the form of a cylinder of same radius as cone. Find the height of the cylinder.
27. Solve by factorization method : $2x^4 - 2\sqrt{6}x + 3 = 0$
28. In a theatre, there are 20 seats in the front row and 30 rows were allotted. Each successive row contains two additional seats than its front row. How many seats are there in the last row?

Part - III

Note : Answer 10 questions. Question No. 42 is compulsory.

10 × 5 = 50

29. A box contains cards numbered 3, 5, 7, 9, ... 35, 37. A card is drawn at random from the box. Find the probability that the drawn card have either multiples of 7 or a prime number.
30. O is any point inside a triangle ABC. The bisector of $\angle AOB$, $\angle BOC$ and $\angle COA$ meet the sides AB, BC and CA in point D, E and F respectively.
- Show that $AD \times BE \times CF = DB \times EC \times FA$
31. Find the sum of $10^3 + 11^3 + 12^3 + \dots + 20^3$.
32. An oil funnel of tin sheet consists of a cylindrical portion 10 cm long attached to a frustum of a cone. If the total height is 22 cm, the diameter of the cylindrical portion be 8cm and the diameter of the top of the funnel be 18 cm, then find the area of the tin sheet required to make the funnel.
33. Show that the angle bisectors of a triangle are concurrent.
34. Two farmers Thilagan and Kausigan cultivates three varieties of grains namely rice, wheat and ragi. If the sale (in ₹) of three varieties of grains by both the farmers in the month of April is given by the matrix.

April sale in ₹

$$A = \begin{bmatrix} \text{rice} & \text{Wheat} & \text{ragi} \\ 500 & 1000 & 1500 \\ 2500 & 1500 & 500 \end{bmatrix} \begin{matrix} \text{Thilagan} \\ \text{Kausigan} \end{matrix}$$

and the May month sale (in ₹) is exactly twice as that of the April month sale for each variety.

- (i) What is the average sales of the months April and May.
- (ii) If the sales continues to increase in the same way in the successive months, what will be sales in the month of August?

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35. Show that the given points are collinear: $(-3, -4)$, $(7, 2)$ and $(12, 5)$
36. A girl is twice as old as her sister. Five years hence, the product of their ages (in years) will be 375. Find their present ages.
37. The area of a triangle is 5 sq.units. Two of its vertices are $(2, 1)$ and $(3, -2)$. The third vertex is (x, y) where $y = x + 3$. Find the coordinates of the third vertex.
38. If $S_n = (x+y) + (x^2+xy+y^2) + (x^3+x^2y+xy^2+y^3) + \dots + n$ terms then prove that $(x-y) S_n = \left[\frac{x^2(x^n-1)}{x-1} - \frac{y^2(y^n-1)}{y-1} \right]$
39. If $x \sin^3 \theta + y \cos^3 \theta = \sin \theta \cos \theta$ and $x \sin \theta = y \cos \theta$, then prove that $x^2 + y^2 = 1$.
40. In a game, the entry fee is ₹150. The game consists of tossing a coin 3 times. Dhana bought a ticket for entry. If one or two heads show, she gets her entry fee back. If she throws 3 heads, she receives double the entry fees. Otherwise she will lose. Find the probability that she
(i) gets double entry fee (ii) just gets her entry fee (iii) loses the entry fee.
41. Solve the following quadratic equation by completing the square method $\frac{5x+7}{x-1} = 3x+2$
42. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm, ...24 cm. How much area can be decorated with these colour papers?

Part - IV

Note : Answer All questions.

$2 \times 8 = 16$

43. (a) Take a point which is 11 cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point.
- (OR)
- (b) Draw a tangent to the circle from the point P having radius 3.6 cm, and centre at O. Point P is at a distance 7.2 cm from the centre.
44. (a) The following table shows the data about the number of pipes and the time taken to fill the same tank.

| | | | | |
|-------------------------|----|----|----|----|
| No. of pipes (x) | 2 | 3 | 6 | 9 |
| Time Taken (in min) (y) | 45 | 30 | 15 | 10 |

Draw the graph for the above data and hence

- (i) find the time taken to fill the tank when five pipes are used
(ii) Find the number of pipes when the time is 9 minutes.

(OR)

- (b) Graph the following quadratic equations and state their nature of solutions. $x^2 + x + 7 = 0$



10th
STD**SURA'S MODEL QUESTION PAPER - 6**

Reg. No.

| | | | | |
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| | | | | |
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Time Allowed : 3.00 Hours]

PART - III
Mathematics

[Maximum Marks : 100

Part - I

- Note :** (1) Answer all the 14 questions.
(2) Choose the most suitable answer from the given four alternatives and write the option code with the corresponding answer. **14 × 1 = 14**

- 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^n (c) $2^{mn} - 1$ (d) 2^{mn}
- Given $f(x) = (-1)^x$ is a function from N to Z. Then the range of f is
(a) {1} (b) N (c) {1, -1} (d) Z
- The least number that is divisible by all the numbers from 1 to 10 (both inclusive)
(a) 2025 (b) 5220 (c) 5025 (d) 2520
- An A.P consist of 31 terms. If its 16th term is 'm'. then the sum of all terms of the A.P is
(a) 16m (b) 62m (c) 31m (d) $3\frac{1}{2}m$
- Graph of a linear equation is a _____.
(a) Straight line (b) Circle (c) Parabola (d) Hyperbola
- If number of columns and rows are not equal in a matrix, then it is said to be a
(a) Diagonal matrix (b) Rectangular matrix (c) Square matrix (d) Identity matrix
- If ΔABC is an isosceles triangle with $\angle C = 90^\circ$ and $AC = 5$ cm, then AB is
(a) 2.5 cm (b) 5cm (c) 10cm (d) $5\sqrt{2}$ cm
- Two poles of heights 6 m and 11 m stand vertically on a plane ground. If the distance between their feet is 12 m, what is the distance between their tops?
(a) 13 m (b) 14 m (c) 15 m (d) 12.8 m
- If the points (2,5), (4,6) and (a,a) are collinear, then the value of a is equal to
(a) -8 (b) 4 (c) -4 (d) 8
- 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
- The total surface area of a hemi-sphere is how much times the square of its radius.
(a) π (b) 4π (c) 3π (d) 2π

[60]

12. 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
13. For any collection of n items $\Sigma(X - X) =$
- (a) ΣX (b) X (c) $n X$ (d) 0
14. The probability of getting a job for a person is $\frac{x}{3}$. If the probability of not getting the job is $\frac{2}{3}$, then the value of x is
- (a) 2 (b) 1 (c) 3 (d) 1.5

Part - II

Answer **any 10** questions. Question No.28 is **compulsory**.

10 × 2 = 20

15. A function f is defined by $f(x) = 3 - 2x$. Find x such that $f(x^2) = [f(x)]^2$
16. Let $A = \{1,2,3,4\}$ and $B = N$. Let $f : A \rightarrow B$ be defined by $f(x) = x^3$ then (i) Find the range of f
(ii) Identify the type of function.
17. Find the number of terms in the A.P, 3, 6, 9, 12111.
18. Simplify : $\frac{x^3}{x-y} + \frac{y^3}{y-x}$
19. Show that the matrices $A = \begin{pmatrix} 1 & 2 \\ 3 & 1 \end{pmatrix}$, $B = \begin{pmatrix} 1 & -2 \\ -3 & 1 \end{pmatrix}$ satisfy commutative property $AB = BA$.
20. In ΔABC , D and E are points on the sides AB and AC respectively such that $DE \parallel BC$. If $\frac{AD}{DB} = \frac{3}{4}$ and $AC = 15$ cm find AE.
21. The line through the points $(-2, a)$ and $(9, 3)$ has slope $-\frac{1}{2}$. Find the value of a .
22. Find the intercepts made by the line $4x - 9y + 36 = 0$ on the coordinate axes.
23. Prove that $\frac{\sec \theta}{\sin \theta} - \frac{\sin \theta}{\cos \theta} = \cot \theta$.
24. A solid iron cylinder has total surface area of 1848 sq.cm. Its curved surface area is five - sixth of its total surface area. Find the radius and height of the iron cylinder.
25. 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 the two cases.
26. The mean of the data is 25.6 and its co-efficient of variation is 18.75. Find the standard deviation.
27. If $P(A) = 0.37$, $P(B) = 0.42$, $P(A \cap B) = 0.09$ then find $P(A \cup B)$.
28. When the positive integers a, b and c are divisible by 13 the respective remainders are 9, 7 and 10. Find the remainder when $a+2b+3c$ is divisible by 13.

Part - III

Answer the following **any 10** questions. Question No.42 is **compulsory**.

10 × 5 = 50

29. Let $A = \{x \in \mathbb{W} \mid x < 2\}$, $B = \{x \in \mathbb{N} \mid 1 < x \leq 4\}$ and $C = \{3, 5\}$. Verify that $A \times (B \cup C) = (A \times B) \cup (A \times C)$
30. If $f(x) = 2x + 3$, $g(x) = 1 - 2x$ and $h(x) = 3x$, prove that $fo(g \circ h) = (f \circ g) \circ h$.
31. In an A.P, sum of four consecutive terms is 28 and their sum of their squares is 276. Find the four numbers.
32. Find the sum of the series $(2^3-1^3) + (4^3-3^3) + (6^3-5^3) + \dots$ n terms.
33. Simplify : $\frac{1}{x^2 - 5x + 6} + \frac{1}{x^2 - 3x + 2} + \frac{1}{x^2 - 8x + 15}$
34. If $x^4 - 8x^3 + mx^2 + nx + 16$ is a perfect square, find the value of m and n .
35. The perpendicular PS on the base QR of a ΔPQR intersects QR at S, such that $QS = 3 SR$. Prove that $2PQ^2 = 2PR^2 + QR^2$.
36. Show that the angle bisectors of a triangle are concurrent.
37. Find the area of the quadrilateral formed by the points $(8,6), (5,11), (-5,12)$ and $(-4,3)$.
38. 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 $(-7,6)$.
39. From the top of a lighthouse, the angle of depression of two ships on the opposite sides of it are observed to be 30° and 60° . If the height of the lighthouse is ' h ' meters and the line joining the ships passes through the foot of the lighthouse. Show that the distance between the ships is $\frac{4h}{\sqrt{3}}$ m.
40. 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.
41. 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
- The student opted for NCC but not NSS
 - The student opted for NSS but not NCC
 - The student opted for exactly one of them.
42. The volume of a cone is $1005 \frac{5}{7}$ cu. cm. The area of its base is $201 \frac{1}{7}$ sq. cm. Find the slant height of the cone.

Part - IV

Answer **all** the questions.

2 × 8 = 16

43. (a) Construct a ΔPQR 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 tangent to the circle from the point P having radius 3.6 cm, and centre at O . Point P is at a distance 7.2 cm from the centre.

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



10. Which of the following is incorrect?
 (a) $P(A) > 1$ (b) $0 \leq P(A) \leq 1$ (c) $P(f) = 0$ (d) $P(A) + P(A) = 1$
11. Graph of a linear equation is a
 (a) straight line (b) circle (c) parabola (d) hyperbola
12. The total surface area of a hemisphere is how much times the square of its radius?
 (a) π (b) 4π (c) 3π (d) 2π
13. Which of the following should be added to make $x^4 + 64$ a perfect square?
 (a) $4x^2$ (b) $16x^2$ (c) $8x^2$ (d) $-8x^2$
14. 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.
 (c) Opposite sides are parallel.
 (d) All sides are of equal length.

Part - II

Note : Answer 10 questions. Question No. 28 is compulsory.

10 × 2 = 20

15. The standard deviation of 20 observations is $\sqrt{6}$. If each observation is multiplied by 3, find the standard deviation and variance of the resulting observations.
16. If one root of the equation $3x^2 + kx + 81 = 0$ (having real roots) is the square of the other then find k .
17. Find the common difference of an A.P in which $t_{18} - t_{14} = 32$.
18. A Relation \mathbb{R} is given by the set $\{(x, y) / y = x + 3, x \in \{0, 1, 2, 3, 4, 5\}\}$. Determine its domain and range.
19. Show the points P(-1.5, 3), Q(6, -2), R(-3, 4) are collinear.
20. The mean of a data is 25.6 and its coefficient of variation is 18.75. Find the standard deviation.
21. If $A = \begin{bmatrix} 0 & 4 & 9 \\ 8 & 3 & 7 \end{bmatrix}$, $B = \begin{bmatrix} 7 & 3 & 8 \\ 1 & 4 & 9 \end{bmatrix}$ find the value $3A - 9B$.
22. Find the number of spherical lead shots, each of diameter 6cm that can be made from a solid cuboids of lead having dimensions 24cm × 22cm × 12cm.
23. The line through the points (-2,6) and (4,8) is perpendicular to the line through the points (8, 12) and (x, 24). Find the value of x .
24. Find the sum and product of the roots of equation $8x^2 - 25 = 0$.
25. A man has 532 flower pots. He wants to arrange them in rows such that each row contains 21 flower pots. Find the number of completed rows and how many flower pots are left over.
26. Show that the straight lines $3x - 5y + 7 = 0$ and $15x + 9y + 4 = 0$ are perpendicular.

27. 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.
28. The range of a set of data is 13.67 and the largest value is 70.08. Find the smallest value.

Part - III

Note : Answer 10 questions. Question No. 42 is compulsory.

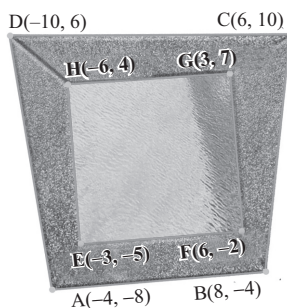
10 × 5 = 50

29. The barrel of a fountain-pen cylindrical in shape, is 7 cm long and 5 mm in diameter. A full barrel of ink in the pen will be used for writing 330 words on an average. How many words can be written using a bottle of ink containing one fifth of a litre?

30. The time taken by 50 students to complete a 100 meter race are given below. Find its standard deviation.

| Time taken (sec) | 8.5-9.5 | 9.5-10.5 | 10.5-11.5 | 11.5-12.5 | 12.5-13.5 |
|--------------------|---------|----------|-----------|-----------|-----------|
| Number of students | 6 | 8 | 17 | 10 | 9 |

31. A man joined a company as Assistant Manager. The company gave him a starting salary of ₹60,000 and agreed to increase his salary 5% annually. What will be his salary after 5 years?
32. A building and a statue are in opposite side of a street from each other 35 m apart. From a point on the roof of building the angle of elevation of the top of statue is 24° and the angle of depression of base of the statue is 34° . Find the height of the statue. ($\tan 24^\circ = 0.4452$, $\tan 34^\circ = 0.6745$)
33. Two triangles QPR and QSR, right angled at P and S respectively are drawn on the same base QR and on the same side of QR. If PR and SQ intersect at T, prove that $PT \times TR = ST \times TQ$.
34. 4 persons live in a conical tent whose slant height is 19 m. If each person require 22 m^2 of the floor area, then find the height of the tent.
35. At a fete, cards bearing numbers 1 to 1000, one number on one card are put in a box. Each player selects one card at random and that card is not replaced. If the selected card has a perfect square number greater than 500, the player wins a prize. What is the probability that (i) the first player wins a prize (ii) the second player wins a prize, if the first has won?
36. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm, ..., 24 cm. How much area can be decorated with these colour papers?
37. In the figure, the quadrilateral swimming pool shown is surrounded by concrete patio. Find the area of the patio.



38. Find the non-zero values of x satisfying the matrix equation $x \begin{bmatrix} 2x & 2 \\ 3 & x \end{bmatrix} + 2 \begin{bmatrix} 8 & 5x \\ 4 & 4x \end{bmatrix} = 2 \begin{bmatrix} x^2 + 8 & 24 \\ 10 & 6x \end{bmatrix}$
39. Water is flowing at the rate of 15 km per hour through a pipe of diameter 14 cm into a rectangular tank which is 50 m long and 44 m wide. Find the time in which the level of water in the tanks will rise by 21 cm.
40. Find the values of a and b if the following polynomials are perfect squares $4x^4 - 12x^3 + 37x^2 + bx + a$
41. A coin is tossed thrice. Find the probability of getting exactly two heads or atleast one tail or two consecutive heads.
42. Find the sum of the Geometric series $3 + 6 + 12 + \dots + 1536$.

Part - IV

Note : Answer All questions.

2 × 8 = 16

43. (a) Construct a ΔPQR which the base $PQ = 4.5$ cm, $\angle R = 35^\circ$ and the median RG from R to PQ is 6 cm.
- (OR)**
- (b) Construct a ΔPQR such that $QR = 6.5$ cm, $\angle P = 60^\circ$ and the altitude from P to QR is of length 4.5 cm.
44. (a) Graph the following quadratic equations and state their nature of solutions. $x^2 - 9x + 20 = 0$
- (OR)**
- (b) Graph the following quadratic equations and state their nature of solutions. $x^2 - 4x + 4 = 0$



ONE MARK ANSWERS

INSTANT SUPPLEMENTARY - JULY 2024

1. (c) 2. (a) 3. (a) 4. (c) 5. (d) 6. (a) 7. (b)
8. (b) 9. (c) 10. (d) 11. (d) 12. (a) 13. (a) 14. (a)

PUBLIC EXAM - APRIL - 2024

1. (c) 2. (a) 3. (d) 4. (c) 5. (b) 6. (a) 7. (a)
8. (b) 9. (b) 10. (a) 11. (a) 12. (d) 12. (c) 14. (b)

INSTANT SUPPLEMENTARY EXAM - JUNE - 2023

1. (b) 2. (a) 3. (c) 4. (b) 5. (a) 6. (a) 7. (b)
8. (b) 9. (b) 10. (d) 11. (c) 12. (d) 13. (a) 14. (b)

PUBLIC EXAM - APRIL - 2023

1. (c) 2. (d) 3. (d) 4. (b) 5. (a) 6. (c) 7. (c)
8. (b) 9. (c) 10. (a) 11. (a) 12. (d) 13. (a) 14. (c)

INSTANT SUPPLEMENTARY EXAM - AUGUST - 2022

1. (b) 2. (c) 3. (c) 4. (d) 5. (a) 6. (b) 7. (a)
8. (b) 9. (c) 10. (b) 11. (a) 12. (b) 13. (c) 14. (b)

PUBLIC EXAM - MAY - 2022

1. (d) 2. (b) 3. (d) 4. (b) 5. (b) 6. (b) 7. (d)
8. (b) 9. (c) 10. (b) 11. (b) 12. (a) 13. (b) 14. (b)

INSTANT SUPPLEMENTARY EXAM - SEPTEMBER - 2021

1. (c) 2. (c) 3. (d) 4. (b) 5. (b) 6. (b) 7. (d)
8. (b) 9. (b) 10. (c) 11. (b) 12. (a) 13. (b) 14. (b)

PTA QUESTION PAPER - 1

1. (a) 2. (a) 3. (d) 4. (c) 5. (b) 6. (b) 7. (c)
 8. (a) 9. (d) 10. (c) 11. (d) 12. (b) 13. (c) 14. (a)

PTA QUESTION PAPER - 2

1. (a) 2. (b) 3. (b) 4. (b) 5. (c) 6. (a) 7. (b)
 8. (b) 9. (c) 10. (b) 11. (b) 12. (b) 13. (b) 14. (c)

PTA QUESTION PAPER - 3

1. (c) 2. (c) 3. (c) 4. (b) 5. (a) 6. (d) 7. (a)
 8. (d) 9. (b) 10. (d) 11. (c) 12. (a) 13. (a) 14. (c)

PTA QUESTION PAPER - 4

1. (c) 2. (c) 3. (c) 4. (c) 5. (a) 6. (b) 7. (c)
 8. (d) 9. (b) 10. (c) 11. (b) 12. (b) 13. (a) 14. (b)

PTA QUESTION PAPER - 5

1. (d) 2. (a) 3. (c) 4. (a) 5. (c) 6. (a) 7. (d)
 8. (c) 9. (b) 10. (b) 11. (d) 12. (a) 13. (c) 14. (a)

PTA QUESTION PAPER - 6

1. (b) 2. (d) 3. (d) 4. (d) 5. (b) 6. (b) 7. (a)
 8. (b) 9. (d) 10. (b) 11. (d) 12. (a) 13. (c) 14. (c)

SURA'S MODEL QUESTION PAPER - 1

1. (d) 2. (c) 3. (c) 4. (c) 5. (a) 6. (d) 7. (b)
 8. (b) 9. (a) 10. (c) 11. (a) 12. (b) 13. (b) 14. (a)

SURA'S MODEL QUESTION PAPER - 2

1. (b) 2. (b) 3. (c) 4. (a) 5. (a) 6. (b) 7. (a)
 8. (c) 9. (c) 10. (a) 11. (a) 12. (c) 13. (b) 14. (b)

SURA'S MODEL QUESTION PAPER - 3

1. (c) 2. (c) 3. (c) 4. (c) 5. (b) 6. (a) 7. (a)
 8. (b) 9. (d) 10. (a) 11. (c) 12. (a) 13. (b) 14. (c)

SURA'S MODEL QUESTOIN PAPER - 4

1. (b) 2. (d) 3. (a) 4. (a) 5. (c) 6. (d) 7. (a)
 8. (c) 9. (c) 10. (b) 11. (a) 12. (d) 13. (b) 14. (b)

SURA'S MODEL QUESTION PAPER - 5

1. (d) 2. (d) 3. (d) 4. (b) 5. (c) 6. (c) 7. (a)
 8. (c) 9. (b) 10. (b) 11. (c) 12. (d) 13. (b) 14. (c)

SURA'S MODEL QUESTION PAPER - 6

1. (c) 2. (c) 3. (d) 4. (c) 5. (a) 6. (b) 7. (d)
 8. (a) 9. (d) 10. (b) 11. (c) 12. (d) 13. (d) 14. (b)

SURA'S MODEL QUESTION PAPER - 7

1. (c) 2. (a) 3. (b) 4. (a) 5. (b) 6. (b) 7. (a)
 8. (d) 9. (b) 10. (b) 11. (d) 12. (a) 13. (a) 14. (a)

SURA'S MODEL QUESTION PAPER - 8

1. (c) 2. (c) 3. (b) 4. (b) 5. (c) 6. (b) 7. (c)
 8. (b) 9. (b) 10. (d) 11. (b) 12. (c) 13. (b) 14. (b)

SURA'S MODEL QUESTION PAPER - 9

1. (a) 2. (b) 3. (b) 4. (b) 5. (d) 6. (c) 7. (b)
 8. (b) 9. (d) 10. (d) 11. (c) 12. (b) 13. (b) 14. (b)

SURA'S MODEL QUESTION PAPER - 10

1. (b) 2. (b) 3. (c) 4. (a) 5. (a) 6. (b) 7. (a)
 8. (c) 9. (c) 10. (a) 11. (a) 12. (c) 13. (b) 14. (b)

