केंद्रीय विद्यालय संगठन,अहमदाबाद संभाग **SET - A**

Kendriya Vidyalaya Sangathan, Ahmedabad Region

कक्षा दस वीं प्री-बोर्ड-I परीक्षा 2025-26

Pre Board-I Examination 2025-26 for Class X

SUBJECT: MATHEMATICS STANDARD-041

M.M.: 80 **TIME: 3 Hours**

GENERAL INSTRUCTIONS:

Section A: Multiple Choice Questions (MCQs) and Assertion-Reason Based Questions (1 mark each)

Section B: Very Short Answer (VSA) Questions (2 marks each),

Section C: Short Answer (SA) Questions (3 marks each)

Section D: Long Answer (LA) Questions (5 marks each)

Section E: Case Study Based Questions (4 marks each, with sub-parts of 1, 1, and 2 marks)

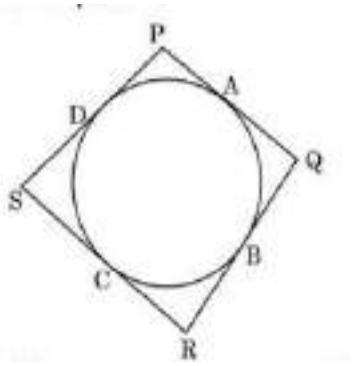
SECTION-A

1 If $x = ab^3$ and $y = a^3b$ where a and b are prime numbers, then [HCF (x, y) - LCM (x, y)] is equal to 1
(a) $1-a^3b^3$ (b) ab(1-ab) (c) $ab-a^4$ (d) ab(1-ab)(1+ab)

2 The distance of the point P(-3,4) from the origin is 1
(a) 8 unit **(b)** 25 unit **(c)** 5 unit **(d)** 7 unit

3 The value of p for which the pair of equation $px + 3y = p - 3,\ 12x + py = 9$ has infinitely many solution is 1
(a) -6 only (c) 6 only
(b) ± 6 (d) any real number except ± 6

4 In a given figure the quadrilateral PQRS circumscribes a circle. Here PA + CS is equal to 1
(a) QR (b) PR (c) PS (d) PQ



5 tan2A = 3 tanA is true, when the measure of ∠A is 1
(a) 90^0 (b) 60^0 (c) 45^0 (d) 30^0

6 The value of p for which $px^2+x+p=0$ has equal and positive roots 1
(a) 2 (b) -2 (c) $\frac{1}{2}$ (d) $-\frac{1}{2}$

7 The hour hand of a clock is 6 cm long. The angle swept by it between 7:20 am and 7:55 am is: 1

(a) $\left(\frac{35}{4}\right)^o$ (b) $\left(\frac{35}{2}\right)^o$ (c) 35^0 (d) 70^0

8 If the probability of a player winning the game is 0.89 then the probability of his losing the same game is 1

(a) 0.79 (b) 0.11 (c) 0.71 (d) 0.41

9 If $\frac{x}{3} = 2\sin A \; and \; \frac{y}{3} = 2\cos A, then \; the \; value \; of \; x^2 + y^2 \; is$ 1

(a) 36 (b) 9 (c) 6 (d) 18

10 The product of two co-prime numbers is 553, their HCF is 1

(a) 1 (b) 7 (c) 553 (d) 79

11 The volume of the largest right circular cone that can be carved out from a solid cube of edge 2 cm is 1

(a) $\frac{4\pi}{3}\ cm^3$ (b) $\frac{5\pi}{3}\ cm^3$ (c) $\frac{\pi}{6}\ cm^3$ (d) $\frac{2\pi}{3}\ cm^3$

12 If $\alpha \; and \; \beta$ are zeroes of the polynomial $ax^2 - 5x + c$ and $\alpha + \beta = \alpha\beta = 10,$ then 1

(a) a = 5, c=$\frac{1}{2}$ (b) a = 1, c=$\frac{5}{2}$ (c) a = $\frac{5}{2}$, c=1 (d) a = $\frac{1}{2}$, c=5

13 The perimeter of the sector of a circle of radius 21 cm which subtends an angle of 60° at the centre of circle, is: 1

(a) 22 cm (b) 43 cm (c) 64 cm (d) 462 cm

14 If ΔABC and ΔPQR are similar triangles such that $\angle A = 31°$ and $\angle R = 69°$, then $\angle Q$ is 1

(a) 70^0 (b) 100^0 (c) 90^0 (d) 80^0

15 The number of red balls in a bag is 10 more than the number of black balls. If the probability of drawing a red ball at random from this bag is $\frac{3}{5}$, then the total number of balls in the bag is : 1

(a) 40 (b) 50 (c) 60 (d) 80

16 If the distance between the points (3,5) and (x, 5) is 15 units, then the values of x are: 1

(a) 12,-18 (b) -12,18 (c) 18, 5 (d) -9, -12

17 The middle most observation of every data arranged in order is called 1

(a) mode (b) median (c) mean (d) arithmetic mean

18 ($\cot\theta + \tan\theta$) equals : 1

(a)$\text{cosec}\theta \sec\theta$ (b) $\cos\theta \tan\theta$ (c) $\sin\theta \sec\theta$ (d)$\sin\theta \cos\theta$

In the following questions 19 and 20, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as: 1

(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).

(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).

(c) Assertion (A) is true but reason (R) is false.

(d) Assertion (A) is false but reason (R) is true

19 **Assertion (A):** The decimal expansion of $\frac{3}{8}$ is terminating. 1

Reason (R): the decimal expansion of rational number is terminating,if the denominator of any rational number has factors 2 and 5 only.

20 **Assertion (A):** If sin A $=\frac{1}{3}$ (0° <A<90°), then the value of cos A is $\frac{2\sqrt{2}}{3}$ 1

Reason (R): For every angle θ, $\sin^2\theta + \cos^2\theta = 1$.

SECTION-B

21 In an AP, if Sn = n (4n + 1), find the AP. 2

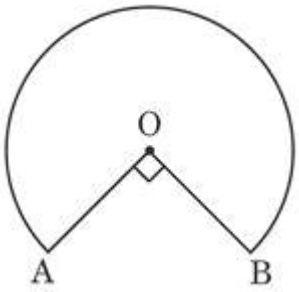
22 **(a)** If a secA+ b tanA=m and b secA+ a tanA = n, prove that $a^2+n^2 = b^2+m^2$ 2

OR

(b) Use the identity: $\sin^2 A + \cos^2 A = 1$ to prove that $\tan^2 A + 1 = \sec^2 A$ Hence, find the value of tan A, when sec A = 5/3 where A is an acute angle.

23 P is a point on the side BC of ΔABC such that ∠APC = ∠BAC. Prove that $AC^2 = BC \cdot CP$. 2

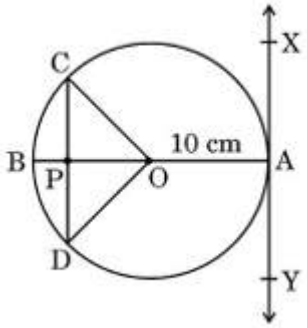
24 **(a)** In the given figure, the shape of the top of a table is that of a sector of a circle with centre O and ∠AOB = 90°. If AO = OB = 42 cm, then find the perimeter of the top of the table. 2



OR

(b) piece of wire 22 cm long is bent into the form of an arc of a circle subtending an angle of 600 at its centre. Find the radius of the circle. (use π = 22/7)

25 At point A on the diameter AB of a circle of radius 10 cm, tangent XAY is drawn to the circle. Find the length of the chord CD parallel to XY at a distance of 16 cm from A. 2



SECTION-C

26 Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle. 3

27 Prove that $\sqrt{5}$ is an irrational number 3

28 Find the zeroes of the quadratic polynomial $x^2 - 15$ and verify the relationship between the zeroes and coefficient of the polynomial. 3

29 **(a)** Prove that $\frac{cos\theta - 2cos^3\theta}{sin\theta - 2sin^3\theta} + cot\theta = 0$ 3

OR

(b) Given that $sin\theta + cos\theta = x,\ prove\ that\ sin^4\theta + cos^4\theta = \frac{2-(x^2-1)^2}{2}$

30 Three unbiased coins are tossed simultaneously. Find the probability of getting : 3
(i) at least one head.
(ii) exactly one tail.
(iii) two heads and one tail.

31 **(a)** For what values of m and n, does the following pair of linear equations have infinitely many solutions? 2x+3y=7; m(x+2y)+n(x-y)=21 3

OR

(b) The sum of the numerator and the denominator of a fraction is 4 more than twice the numerator. If the numerator and denominator are increased by 3, they are in the ratio 2:3. Determine the fraction.

SECTION-D

32 **(a)** Find the value of 'k' for which the quadratic equation $(k+1)x^2-6(k+1)x+3(k+9)=0$,k #-1 has real and equal roots. 5

OR

(b) The age of a man is twice the square of the age of his son. Eight years hence, the age of the man will be 4 years more than three times the age of his son. Find their present ages.

33 If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio. 5

34 **(a)** From one of the faces of a solid wooden cube of side 14 cm, maximum number of hemispheres of diameter 1.4 cm are scooped out. Find the total number of hemispheres that can be scooped out. Also, find the total surface area of the remaining solid. 5

OR

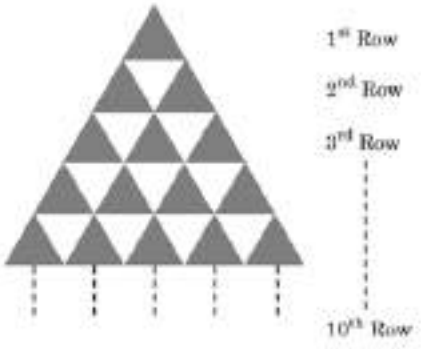
(b) From a solid cylinder of height 24 cm and radius 5 cm, two cones of height 12 cm and radius 5 cm are hollowed out. Find the volume and surface area of the remaining solid.

35 Following distribution shows the marks of 230 students in a particular subject. If the median marks are 46, then find the values of x and y. 5

Marks	Number of students
10-20	12
20-30	30
30-40	X
40-50	65
50-60	Y
60-70	25
70-80	18

SECTION-E

36 In an equilateral triangle of side 10 cm, equilateral triangles of side 1 cm are formed as shown in the figure below, such that there is one triangle in the first row, three triangles in the second row, five triangles in the third row and so on.



Based on given information, answer the following questions using Arithmetic Progression.

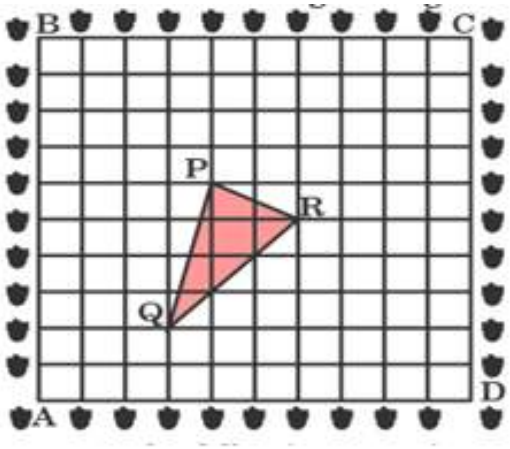
(i) How many triangles will be there in bottom most row ? 1

(ii) How many triangles will be there in fourth row from the bottom ? 1

(iii) **(a)** Find the total number of triangles of side 1 cm each till 8th row. 2

OR

(iii) **(b)** How many more number of triangles are there from 5th row to 10th row than in first 4 rows ? Show working. 2

37 

A garden is in the shape of a square. The gardener grew saplings of Ashoka tree on the boundary of the garden at the distance of 1 m from each other. He wants to decorate the garden with rose plants. He chose a triangular region inside the garden to grow rose plants. In the above situation, the gardener took help from the students of class 10. They made a chart for it which looks like the given figure.

Based on the above, answer the following questions : 1

(i) If A is taken as origin, what are the coordinates of the vertices of ΔPQR? 1

(ii) Find out if ΔPQR is an isosceles triangle.

2

(iii) **(a)** Find distances PQ and QR.

OR 2

(iii) **(b)** Find the coordinates of the point which divides the line segment joining points P and R in the ratio 2:1 internally.

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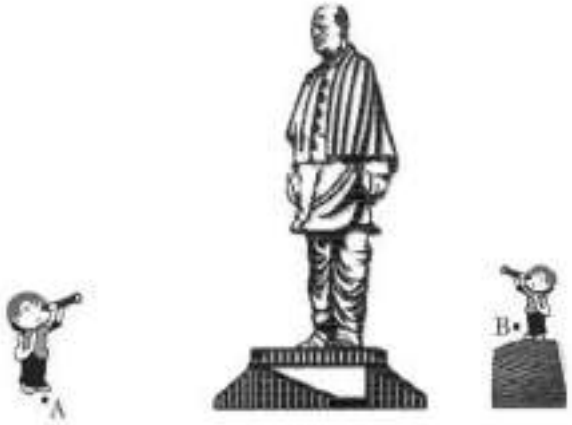

The Statue of Unity situated in Gujarat is the world's largest Statue which stands over a 58 m high base. As part of the project, a student constructed an inclinometer and wishes to find the height of Statue of Unity using it. He noted following observations from two places :

Situation-I :

The angle of elevation of the top of Statue from Place A which is $80\sqrt{3}$ m away from the base of the Statue is found to be 60°.

Situation - II :

The angle of elevation of the top of Statue from a Place B which is 40 m above the ground is found to be 30° and entire height of the Statue including the base is found to be 240 m.

Based on given information, answer the following questions : 1

(i) Represent the Situation - I with the help of a diagram. 1

(ii) Represent the Situation - II with the help of a diagram. 2

(iii) **(a)** Calculate the height of Statue excluding the base and also find the height including the base with the help of Situation - I.

OR 2

(iii) **(b)** Find the horizontal distance of point B (Situation - II) from the Statue and the value of $\tan\propto$, where $\propto$ is the angle of elevation of top of base of the Statue from point B.

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