Pre – Board Examination (2025-26)
Class- X
Subject- Mathematics (Standard) Code No. - 041

Time: 3 hours **MM - 80**

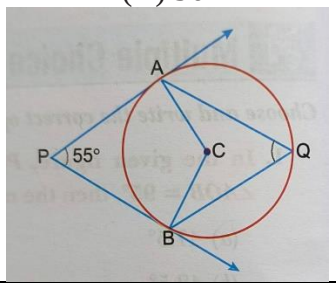
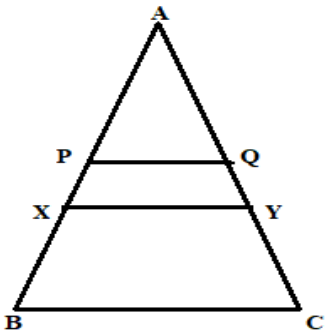
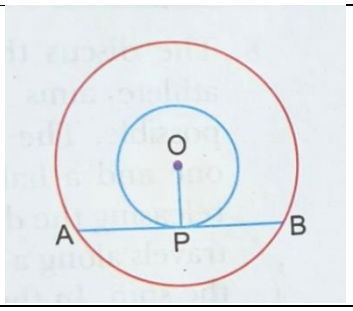
General Instructions:
Read the following instructions carefully and follow them:

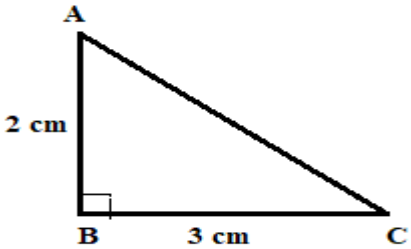
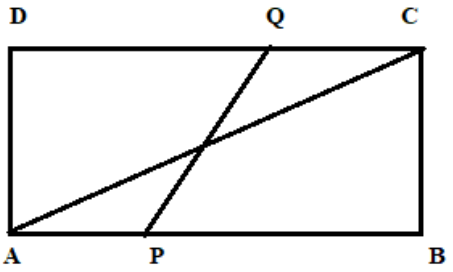
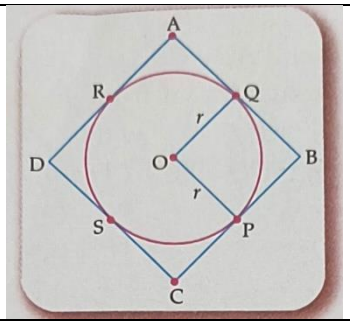
1. This question paper contains 38 questions. All Questions are compulsory.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1-18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion- Reason based questions of 1 mark each.
4. In Section B, Questions no. 21-25 are very short answer (VSA) type questions, carrying 02 marks each.
5. In Section C, Questions no. 26-31 are short answer (SA) type questions, carrying 03 marks each.
6. In Section D, Questions no. 32-35 are long answer (LA) type questions, carrying 05 marks each.
7. In Section E, Questions no. 36-38 are case study based questions carrying 4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.
8. There is no overall choice. However, an internal choice in 2 Question of Section B, 2 Questions of Section C and 2 Questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.
9. Draw neat and clean figures wherever required.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

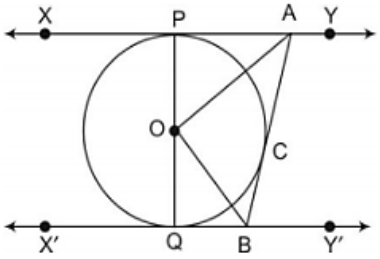
SECTION - A

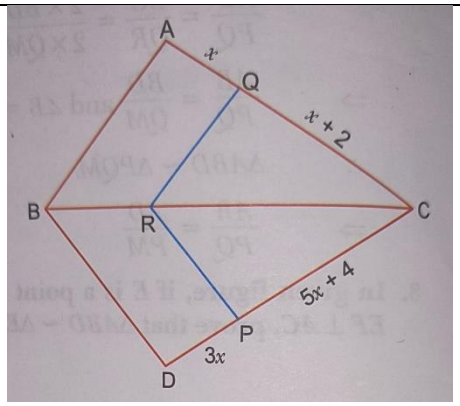
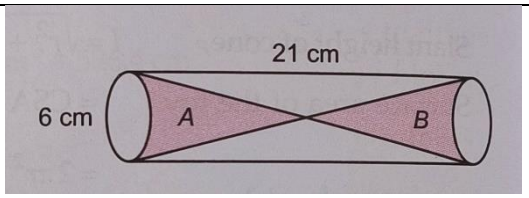
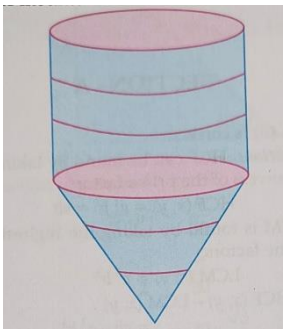
Section A consists of 20 questions of 1 mark each.

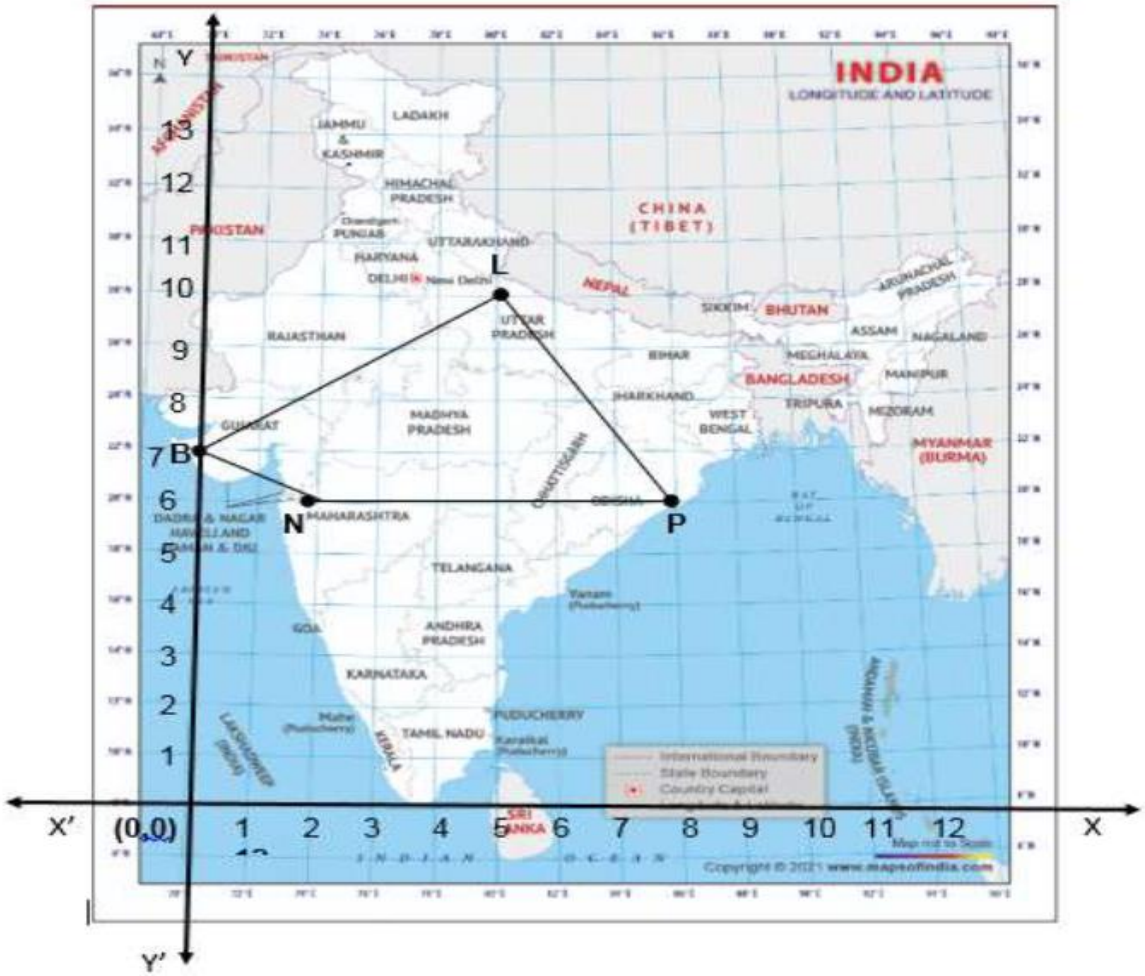
S.NO	Question	Marks
1	Let 'a' and 'b' be the two positive integers such that $a = p^3q^4$ and $b = p^2q^3$, where p and q are prime numbers. If HCF(a,b) = p^mq^n and LCM(a,b) = p^rq^s, then (m+n) (r+s) = (A) 15 (B) 30 (C) 35 (D) 72	1
2	If one of the zeros of a quadratic polynomial of the form $x^2 + ax + b$ is the negative of the other, then it (A) has no linear term and the constant term is negative. (B) has no linear term and the constant term is positive. (C) can have a linear term but the constant term is negative. (D) can have a linear term but the constant term is positive.	1
3	The pair of equations $ax + 2y = 9$ and $3x + by = 18$ represent parallel lines, where a,b are integers, if (A) a = b (B) 3a = 2b (C) 2a = 3b (D) ab = 6	1
4	Which of the following quadratic equations has the sum of its root as 4? (A) $2x^2 - 4x + 8 = 0$ (B) $-x^2 + 4x - 4 = 0$ (C) $\sqrt{2}\,x^2 - \frac{4}{\sqrt{2}}x + 1 = 0$ (D) $4x^2 - 4x + 4 = 0$	1
5	If the mid- point of the line segment joining the points (a, 4) and (2, 2b) is (2, 6), then the value of (a+b) is given by: (A) 6 (B) 7 (C) 8 (D) 16	1
6	If $\alpha + \beta = 90^0$ and $\alpha = 2\beta$, then $\cos^2\alpha + \sin^2\beta$ is equal to : (A) 0 (B) $\frac{1}{2}$ (C) 1 (D) 2	1

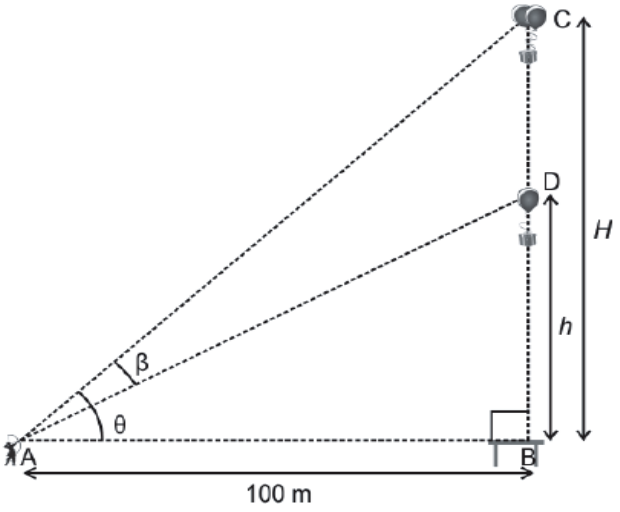
7	In the given figure, PA and PB are tangents from external point P to a circle with centre C and Q is any point on the circle. Then the measure of ∠AQB is: (A) 62.5^0 (B) 125^0 (C) 55^0 (D) 90^0 	1
8	Two numbers are in the ratio 4:5 and their HCF is 11. Find the LCM of these numbers. (A) 220 (B) 200 (C) 120 (D) 300	1
9	In the adjoining figure, PQ ∥ XY ∥ BC, AP = 2 cm, PX = 1.5 cm and BX = 4 cm. If QY = 0.75 cm, then AQ + CY is: (A) 6 cm (B) 4.5 cm (C) 3 cm (D) 5.25 cm 	1
10	In the adjoining figure, AB is the chord of the larger circle touching the smaller circle. The centre of both the circles is O. If AB = 2r and OP = r, then the radius of larger circle is : (A) 2r (B) 3r (C) $2\sqrt{2}$r (D) $r\sqrt{2}$ 	1
11	If $(\tan\theta + \sin\theta) = m$ and $(\tan\theta - \sin\theta) = n$, then $m^2 - n^2$ is equal to: (A) $4\sqrt{mn}$ (B) $\sqrt{mn}$ (C) $2\sqrt{mn}$ (D) $3\sqrt{mn}$	1
12	The length of a minor arc is $\frac{2}{8}$ of the circumference of the circle. Find the area of minor sector if radius of the circle is 2 cm. (A) π (B) 2π (C) 3 π (D) $\frac{\pi}{2}$	1
13	AD is the median of ΔABC with vertices A (5,-6), B (6,4) and C(0,0). Length of AD is equal to : (A) $\sqrt{68}$ units (B) $2\sqrt{15}$ units (C) $\sqrt{101}$ units (D) 10 units	1
14	Area of the largest triangle that can be inscribed in a semi – circle of radius 'r' units is: (A) r^2 squ. units (B) $\frac{1}{2}$ r^2 squ. units (C) $2r^2$ squ. units (D) $r^2\sqrt{2}$ squ. units	1
15	If a cone of greatest possible volume is hollowed out from a solid wooden cylinder, then the ratio of the volume of remaining wood to the volume of cone hollowed out is: (A) 1:1 (B) 1:3 (C) 2:1 (D) 3:1	1
16	The mean of five observations is 15. If the mean of first three observations is 14 and that of last three observations is 17, then the third observation is: (A) 20 (B) 19 (C) 18 (D) 17	1
17	The probability of drawing an even prime number out of numbers from 1 to 30 is: (A) $\frac{1}{30}$ (B) $\frac{4}{15}$ (C) $\frac{7}{30}$ (D) 0	1
18	For the following distribution: Class: 0-5 | 5-10 | 10-15 | 15-20 | 20-25 Frequency: 10 | 15 | 12 | 20 | 9	1

	The sum of lower limits of the median class and modal class is (A) 15 (B) 25 (C) 30 (D) 35	
	DIRECTION: In the question number 19 and 20, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option **(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 and 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 perimeter of ΔABC is a rational number. **Reason (R) :** The sum of the squares of two rational numbers is always rational. 	1
20	**Assertion (A):** The value of $sin\theta = \frac{4}{3}$ is not possible. **Reason (R) :** Hypotenuse is the longest side in any right angled triangle.	1
	SECTION B	
	Section B consists of 5 questions of 2 marks each.	
S.No	Question	**Marks**
21	The sum of the first three terms of an AP is 33. If the product of the first and the third term exceeds the second term by 29, find the AP. OR Find the sum of first seven numbers which are multiples of 2 as well as of 9.	2
22	ABCD is a parallelogram, point P divides AB in the ratio 2:3 and point Q divides DC in the ratio 4:1. Prove that OC is half of OA. 	2
23	In the given figure, a circle is inscribed in a quadrilateral ABCD in which ∠B = 90^0. If AD = 23 cm, AB = 29 cm and DS = 5 cm, find the radius **'r'** of the circle. 	2
24	Prove that : $1 + \frac{cot^2\theta}{1+cosec\theta} = cosec\theta$	2
25	With vertices A, B and C of ΔABC as centres, arcs are drawn with radii 14 cm and the three portions of the triangle so obtained are removed. Find the total area removed from the triangle. OR	2

	An arc of a circle of radius 10 cm subtends an angle of 60^0 at the centre. Find the area of the minor segment of the circle made by the corresponding chord.	
	SECTION C	
	Section C consists of 6 questions of 3 marks each.	
S.No	Question	**Marks**
26	National Art Convention got registration of students from all parts of the country, of which 60 are interested in music, 84 are interested in dance and 108 students are interested in handicrafts. For optimum cultural exchange, organisers wish to keep them in minimum number of groups such that each group consists of students interested in the same art form and the number of students in each group is the same. Find the number of students in each group. Find the number of groups in each art form. How many rooms are required if each group will be allotted a room?	3
27	Find the zeros of the quadratic polynomial $pqx^2 + (pr + qs)x + rs$ and verify the relationship between the zeros and the coefficients.	3
28	Kamlesh sold a table and a chair for Rs 1050, thereby making a profit of 10% on the table and 25% on the chair. If he had taken a profit of 25% on the table and 10% on the chair he would have got Rs 1065. Find the cost price of each. OR Draw the graphs of the lines $x = -2$ and $y = 3$. Write the vertices of the figure formed by these lines, the x-axis and the y-axis. Also, find the area of the figure.	3
29	In given figure XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B. Prove that $\angle AOB = 90°$.  	3
30	Given that $\sin\theta + cos\theta = x$, prove that $\sin^4\theta + cos^4\theta = \frac{2-(x^2-1)^2}{2}$ **OR** If $\sin\theta + \sin^2\theta = 1$, then find the value of :- $\cos^{12}\theta + 3\cos^{10}\theta + 3\cos^8\theta + \cos^6\theta + 2\cos^4\theta + 2\cos^2\theta - 2$	3
31	Two different dice are rolled together. Find the probability of getting : (i) a multiple of 2 on one and a multiple of 3 on the other dice. (ii) the product of two numbers on the top of the two dice is a perfect square. (iii) a doublet	3
	SECTION D	
	Section D consists of 4 questions of 5 marks each.	

S.No	Question	Marks
32	***State and prove Basic proportionality theorem***. Using the above theorem, find the value of 'x' in the given figure where QR ‖ AB and RP ‖ BD.  	3+2
33	A person on tour has ₹ 10800 for his expenses. If he extends his tour by 4 days, he has to cut down his daily expenses by₹ 90. Find the original duration of the tour.	5
34	Two solid cones A and B are placed in a cylindrical tube as shown in the figure. The ratio of their capacities is 2:1. Find the heights and capacities of cones. Also, find the volume of the remaining portion of the cylinder.  OR Fermentation tanks are designed in the form of cylinder mounted on a cone as shown in figure: The total height of the tank is 3.3 m and height of conical part is 1.2 m. The diameter of the cylindrical as well as conical part is 1 m. Find the capacity of the tank. If the level of liquid in the tank is 0.7 m from the top, find the surface area of the tank in contact with liquid. 	5 5
35	Following data shows the number of family members living in different bungalows of a locality: **Number of members** | 0-2 | 2-4 | 4-6 | 6-8 | 8-10 | Total **Number of bungalows** | 10 | p | 60 | q | 5 | 120 If the median number of members is found to be 5, find the values of **p** and **q**. Also, find the mean if mode of the data 5.01. OR Find the **missing frequency 'f'** in the following table, if the mean of the given data is 18. **Hence**, find the mode. **Daily allowance** | 11-13 | 13-15 | 15-17 | 17-19 | 19-21 | 21-23 | 23-25 **Number of children** | 7 | 6 | 9 | 13 | f | 5 | 4	5 5

S.N	Question	Marks
	SECTION E	
	Case study based questions are compulsory. This section comprises of 3 case-study based questions of 4 marks each with three sub-parts	
36	In a pathology lab, a culture test has been conducted. In the test, the number of bacteria taken into consideration in various samples is all 3 – digit numbers that are divisible by 7, taken in order.  (1) How many bacteria are considered in the fifth sample? (2) How many samples should be taken into consideration? Or Find the total number of bacteria in the first 10 samples. (3) How many bacteria are there in the 7th sample from the last?	1 1 2
37	. In a GPS, The lines that run east-west are known as lines of latitude, and the lines running north-south are known as lines of longitude. The latitude and the longitude of a place are its coordinates and the distance formula is used to find the distance between two places. The distance between two parallel lines is approximately 150 km. A family from Uttar Pradesh planned a round trip from Lucknow (L) to Puri (P) via Bhuj (B) and Nashik (N) as shown in the given figure below.  Based on the above information answer the following questions using the coordinate geometry. (i) Find the distance between Lucknow (L) to Bhuj(B). (ii) If Kota (K), internally divide the line segment joining Lucknow (L) to Bhuj (B) into 3 : 2 then find the coordinate of Kota (K). (iii) Name the type of triangle formed by the places Lucknow (L), Nashik (N) and Puri (P).	1 1 1

	[OR] Find a place (point) on the longitude (y-axis) which is equidistant from the points Lucknow (L) and Puri (P).	2
38	At an archery academy, Guru Drona had floated a gift box with two balloons at a height of **'H'** meters from the table. As part of his practice, Arjuna was given the task to bring the gift box to the table placed below. Arjuna was standing on the ground at a horizontal distance of 100 meters from the table kept at point B. He aimed at the balloons with an elevation angle of '**θ**' and shot the arrow to burst one of the balloons. When Arjuna burst the first balloon, the box came down to the height of **'h'** meters from the table. He now reduced his angle of elevation by **'β'** and shot his arrow at the second balloon. The second balloon burst and the gift box landed safely on the table. Assume that Arjuna's arrows travelled in straight lines and did not curve down.  *(Note: The figure is not to scale.)* (Use √3 = 1.73, √2 = 1.41) (i) What was the original height of the gift box, if $\theta = 45^0$? (ii) What is the distance that the arrow has to travel to burst the second balloon, if $\theta = 45^0$ and $\beta = 15^0$? (iii) If $\theta = 45^0$ and $\beta = 15^0$, what is the difference between the box's initial height and its height after the first shot? **OR** If $\theta = 60^0$ and $\beta = 30^0$, what is the value of the ratio $\frac{H}{h}$?	1 1 2