Series P/PB2/1

SET 1

CLASS X PRE-BOARD EXAMINATION – 2025-26

Q.P. Code: 041/2/1

Roll No. | | | | | | | | |

Candidate must write the Q.P. Code on the title page of the answer-book.

- Please check that this question paper contains **10** printed pages.
- Please check that this question paper contains **38** questions.
- Q.P. Code given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- **Please write down the serial number of the question in the answer-book before attempting it.**
- 15 minute time has been allotted to read this question paper. The students will read the question paper only and will not write any answer on the answer-book during this period.

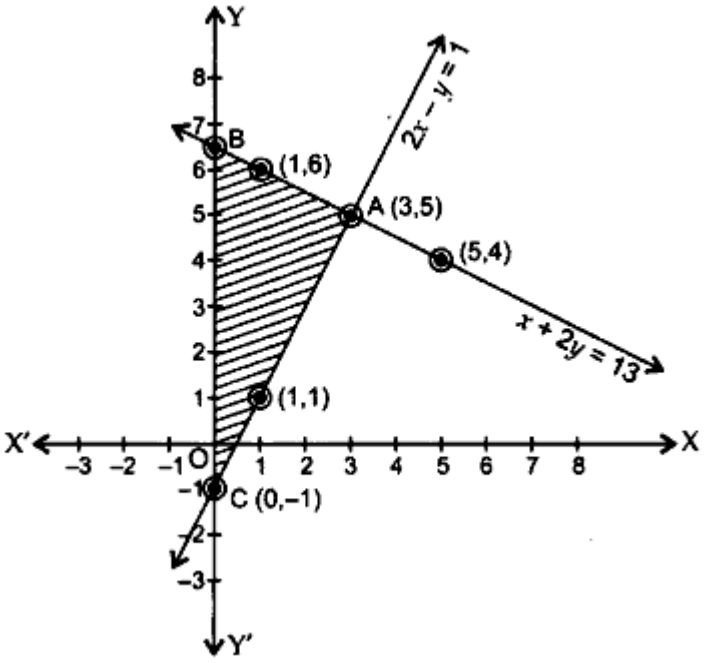
MATHEMATICS (STANDARD)

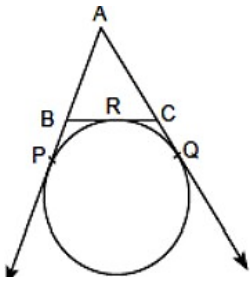
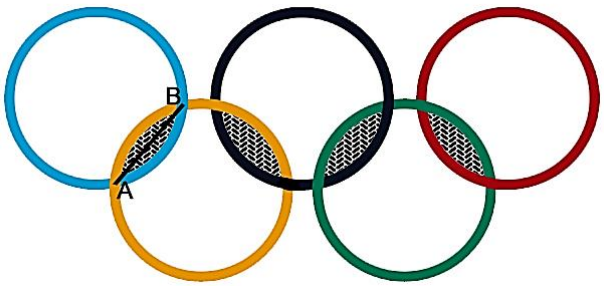
Time allowed : 3 hours *Maximum Marks : 80*

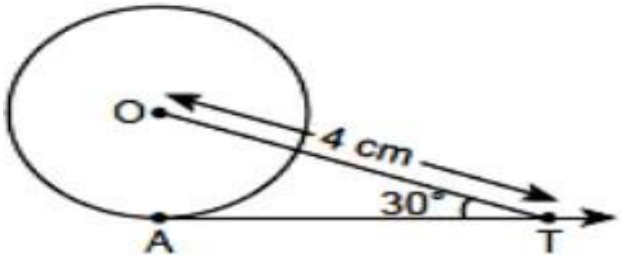
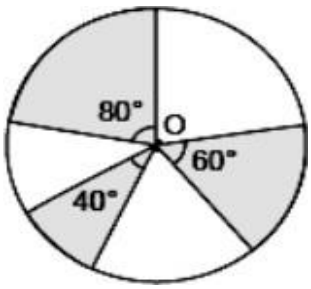
General Instructions:

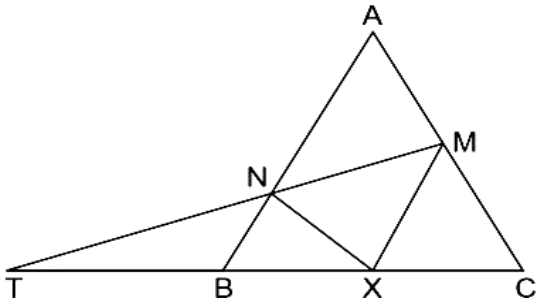
Read the following instructions very carefully and strictly follow them:

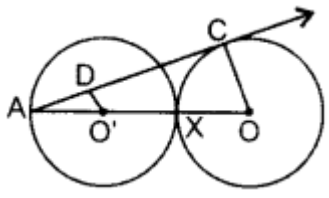
1. This question paper contains **38** questions. **All** questions are **compulsory**.
2. This Question Paper is divided into **5** Sections **A, B, C, D** and **E**.
3. In **Section A**, Questions no. **1 to 18** are multiple choice questions (MCQs) and questions no. **19 and 20** are Assertion- Reason based questions of **1** mark each.
4. In **Section B**, Questions no. **21 to 25** are very short answer (VSA) type questions, carrying **2** marks each.
5. In **Section C,** Questions no. **26 to 31** are short answer (SA) type questions, carrying **3** marks each.
6. In **Section D**, Questions no. **32 to 35** are long answer (LA) type questions, carrying **5** marks each.
7. In **Section E**, Questions no. **36 to 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 is provided 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. Take $\boldsymbol{\pi = \frac{22}{7}}$ wherever required if not stated.
10. Use of calculator is **NOT allowed**.

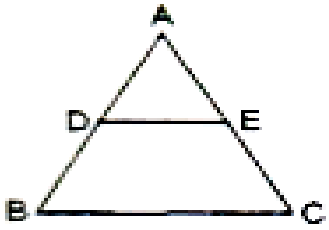
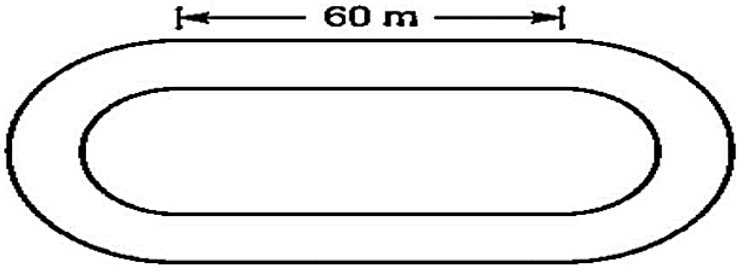
Qn No	Questions	Marks
	SECTION A **Section A consists of 20 questions of 1 mark each.**	
1	The HCF of 2472, 1284 and a third number N is 12. If their LCM is $2^3 \times 3^2 \times 5 \times 103 \times 107$, then the number N is : (A) $2^2 \times 3^2 \times 7$ (B) $2^2 \times 3^3 \times 103$ (C) $2^2 \times 3^2 \times 5$ (D) $2^4 \times 3^2 \times 11$	**1**
2	The largest number which divides 70 and 125 leaving remainders 5 and 8 respectively is (A) 13 (B) 65 (C) 875 (D) 1750	**1**
3	The value of k such that the quadratic polynomial $x^2 - (k + 6)x + 2(2k + 1)$ has sum of the zeroes as half of their product, is (A) 2 (B) 3 (C) –5 (D) 5	**1**
4	The area of the triangular region, in the following figure, bounded by the lines 2x-y=1 and x+2y=13 and Y-axis is  (A) 11.25 sq.units (B) 16.25 sq.units (C) 9.75 sq.units (D) 18.75 sq.units	**1**
5	ABCD is a trapezium with AD ∥ BC and AD = 4cm. If the diagonals AC and BD intersect each other at O such that $\frac{AO}{OC} = \frac{DO}{OB} = \frac{1}{2}$, then BC = (A) 6cm (B) 7cm (C) 8cm (D) 9cm	**1**
6	If a and b are the roots of the equation $x^2 + ax - b = 0$, then find a and b. (A) a = – 1 and b = 2 (B) a = 1 and b = 2 (C) a = – 2 and b = 1 (D) a = 2 and b = – 1	**1**

Qn No	Questions	Marks
7	The perimeter of a triangle with vertices (0, 4), (0, 0) and (3, 0) is (A) 5 units (B) 12 units (C) 11 units (D) (7 + √5) units	**1**
8	The centre of a circle is at (2, 0). If one end of a diameter is at (6, 0), then the other end is at : (A) (0, 0) (B) (4, 0) (C) (-2, 0) (D) (-6, 0)	**1**
9	If $\tan\theta = \frac{m}{n}$, then $\frac{m\sin\theta - n\cos\theta}{m\sin\theta + n\cos\theta} =$ (A) $\frac{m^2-n^2}{m^2+n^2}$ (B) $\frac{n^2-m^2}{n^2+m^2}$ (C) $\frac{m^2+n^2}{m^2-n^2}$ (D) 1	**1**
10	If cos (α + β) = 0, then value of $\cos\left(\frac{\alpha+\beta}{2}\right)$ equal to: (A) 1 /√2 (B) 1/ 2 (C) 0 (D) √2	**1**
11	If the probability of the letter chosen at random from the letters of the word "Mathematics" to be a vowel is $\frac{2}{2x+1}$, then x is equal to (A) 4 /11 (B) 9 /4 (C) 11/ 4 (D) 4 /9	**1**
12	In figure, AP, AQ and BC are tangents to the circle. If AB = 5 cm, AC = 6 cm and BC = 4 cm, then the length of AP (in cm) is  (A) 7.5 (B) 15 (C) 10 (D) 9	**1**
13	Given below is the picture of the Olympic rings made by taking five congruent circles of radius 1cm each, intersecting in such a way that the chord formed by joining the point of intersection of two circles is also of length 1cm.Total area of all the dotted regions (assuming the thickness of the rings to be negligible) is  (A) $4(\pi/12 - \sqrt{3}/4)cm2$ (B) $(\pi/6 - \sqrt{3}/4)$ cm^2 (C) 4[π/ 6 - √3 /4] cm^2 (D) 8[π /6 - √3 /4] cm^2	**1**

Qn No	Questions	Marks
14	After an examination, a teacher wants to know the marks obtained by maximum number of the students in her class. She requires to calculate .....of marks. (A) median (B) mode (C) mean (D) range	**1**
15	Fifteen solid spheres are made by melting a solid metallic cone of base diameter 2cm and height 15cm. The radius of each sphere is: (A) ½ (B) ¼ (C) $1/\sqrt[2]{3}$ (D) $1/\sqrt[3]{4}$	
16	In the ΔABC, DE ∥ BC and AD = 3x − 2, AE = 5x − 4, BD = 7x − 5, CE = 5x − 3, then find the value of x (A) 1 (B) 7/10 (C) both (a) & (b) (D) none of these	**1**
17	In figure AT is a tangent to the circle with centre O such that OT = 4 cm and OTA = 30°. Then AT is equal to  (A) 4 cm (B) 2 cm (C) 2√3 cm (D) 4 √3 cm	**1**
18	In the given figure, three sectors of a circle of radius 7 cm, making angles of 60°, 80° and 40° at the centers are shaded. The area of the shaded region (in cm^2) is [Use π =22 /7] (A) 77 (B) 154 (C) 44 (D) 22  	**1**
	DIRECTIONS: 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.	**1**

Qn No	Questions	Marks
19	Assertion (A): For no value of n, where n is a natural number, the number 6^n ends with the digit zero. Reason (R): For a number to end with digit zero, its prime factors should have 2 and 5.	1
20	Assertion (A): The value of each of the trigonometric ratios of an angle do not vary with the lengths of the sides of the triangle, if the angle remains the same. Reason (R): In right ΔABC, ∠B = 90° and ∠A = θ, sin θ = BC/ AC < 1 and cos θ = AB /AC < 1 as hypotenuse is the longest side.	1
	SECTION – B **Section B consists of 5 questions of 2 marks each.**	
21	The length of the minute hand of a clock is 14 cm. Find the area swept by the minute hand in 5 minutes.	2
22	The probability of selecting a blue marble at random from a jar that contains only blue, black and green marbles is 1/5. The probability of selecting a black marble at random from the same jar is 1/4. If the jar contains 11 green marbles, find the total number of marbles in the jar.	2
23	X is a point on the side BC of ΔABC. XM and XN are drawn parallel to AB and AC respectively meeting AB in N and AC in M. MN produced meets CB produced at T. Prove that $TX^2 = TB \times TC$.  **OR** If AP and DQ are medians of triangles ABC and DEF respectively, where ΔABC~ ΔDEF, then prove that $AB/\ DE = AP/\ DQ$	2
24	An AP consists of 21 terms. The sum of the three terms in the middle is 129 and of the last three is 237. Find the AP. **OR** How many natural numbers are there between 200 and 500, which are divisible by 7?	2
25	If sin(A + B) = 1 and cos(A – B) = √3/2, 0°< A + B ≤ 90° and A > B, then find the measures of angles A and B.	2

Qn No	Questions	Marks
	SECTION – C **Section C consists of 6 questions of 3 marks each.**	
26	Ravish runs a book shop at school of Math, Gurgaon. He received 480 chemistry books, 192 physics books and 672 Mathematics books of class XI. He wishes to arrange these books in minimum numbers of stacks such that each stack consists of the books on only one subject and the number of books in each stack is the same. (a) Find the number of books in each stack. (b) Find the Number of stacks of Mathematics books are (c) Find the Minimum number of stacks of all the books.	**3**
27	If one zero of the polynomial $(k + 1)x^2 – 5x + 5$ is multiplicative inverse of the other, then find the zeroes of $kx^2 – 3kx + 9$, where k is a constant.	**3**
28	Two friends purchased the same company car and same green colour. They are travelling in separate car which starts at place A and other car at place B. Place A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. Situation I: If the cars travel in the same direction at different speeds, they meet in 5 hours. Situation II: If they travel towards each other, they meet in 1 hour What is the speed of car starts at A and speed of car starts at B? **OR** Anuj had some chocolates, and he divided them into two lots A and B. He sold the first lot at the rate of ₹2 for 3 chocolates and the second lot at the rate of ₹1 per chocolate, and got a total of ₹400. If he had sold the first lot at the rate of ₹1 per chocolate, and the second lot at the rate of ₹4 for 5 chocolates, his total collection would have been ₹460. Find the total number of chocolates he had.	**3**
29	Vijay is trying to find the average height of a tower near his house. He is using the properties of similar triangles. The height of Vijay's house if 20 m when Vijay's house casts a shadow 10 m long on the ground. At the same time, the tower casts a shadow 50 m long on the ground and the house of Ajay casts 20 m shadow on the ground. (a) What is the height of the tower? (b) What will be the length of the shadow of the tower when Vijay's house casts a shadow of 12 m?	**3**
30	In the figure, two equal circles, with centres O and O', touch each other A at X. OO' produced meets the circle with centre O' at A. AC is tangent to the circle with centre O, at the point C. O'D is perpendicular to AC. Find the value of DO'/CO.  	**3**

Qn No	Questions	Marks
31	**sin A(1 + tan A) + cos A(1 + cot A) = sec A + cosec A** **OR** Prove that following identity, where the angle involved is acute angle for which the expression are expressed $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = cosec\ A + \cot A$	3
	SECTION – D **Section D consists of 4 questions of 5 marks each**	
32	If a line is drawn parallel to one side of a triangle, the other two sides are divided in the same ratio, prove it. Use this result to prove the following : In figure, D and E are points on AB and AC respectively, such that DE || BC. If AD = $\frac{1}{3}$ BD, AE = 4.5 cm, find EC. 	5
33	Raj and Ajay are very close friends. Both the families decide to go to Ranikhet by their own cars. Raj's car travels at a speed of x km/h while Ajay's car travels 5 km/h faster than Raj's car. Raj took 4 hours more than Ajay to complete he journey of 400 km. What is the speed of Raj's car?	5
34	A vessel full of water is in the form of an inverted cone of height 8 cm and the radius of its top, which is open, is 5 cm. 100 spherical lead balls are dropped into the vessel. One fourth of the water flows out of the vessel. Find the radius of a spherical ball. **OR** The below figure depicts a racing track whose left and right ends are semicircular. The distance between the two inner parallel line segments is 60 m and they are each 106 m long. If the track is 10 m wide, find : **(i)** the distance around the track along its inner edge **(ii)** the area of the track. 	5

Qn No	Questions	Marks
35	An age-wise list of number of literate people in a block is prepared in the following table. There are total 100 people and their median age is 41.5 years. Information about two groups are missing, which are denoted by x and y. Find the value of x and y.	**5**

Age (in years)	10-20	20-30	30-40	40-50	50-60	60-70	70-80
No. of literate people	15	x	12	20	y	8	10

OR

The monthly expenditure on milk in 200 families of a Housing Society is given below:

Monthly Expenditure (in Rs.)	1000 - 1500	1500-2000	2000-2500	2500-3000	3000-3500	3500-4000	4000-4500	4500-5000
Number of families	24	40	33	X	30	22	16	7

Find the value of x and also, find the mean expenditure on milk.

SECTION – E

Section E consists of 3 case study-based questions of 4 marks each.

36	In the month of April to June 2022, the exports of passenger cars from India increased by 26% in the corresponding quarter of 2021–22, as per a report. A car manufacturing company planned to produce 1800 cars in 4^{th} year and 2600 cars in 8^{th} year. Assuming that the production increases uniformly by a fixed number every year.	**4**



Based on the above information answer the following questions.

(i) Find the production in the 1^{st} year. **1**

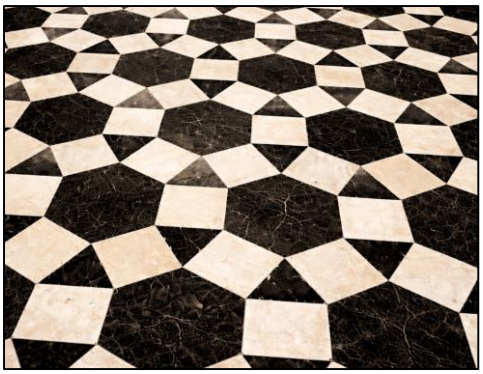
(ii) Find the production in the 12^{th} year. **1**

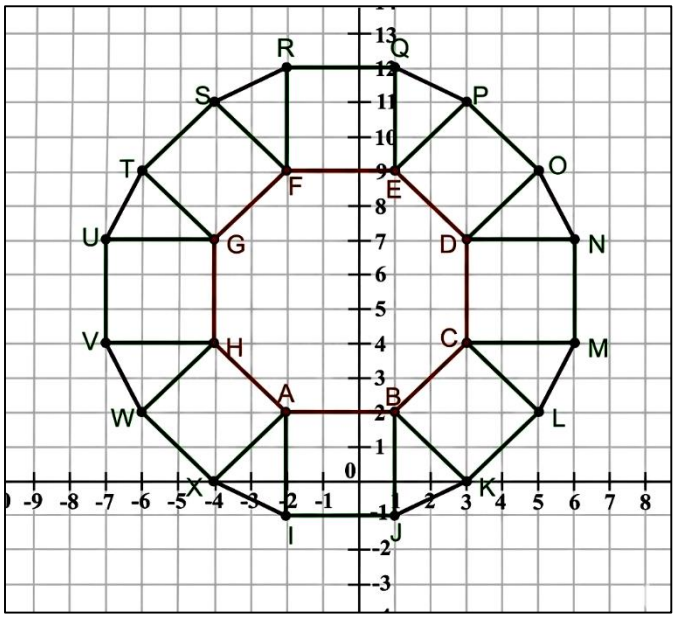
(iii) Find the total production in first 10 years. **2**

OR

(iv) In how many years will the total production reach 31200 cars? **2**

Qn No	Questions	Marks
37	A tiling or tessellation of a flat surface is the covering of a plane using one or more geometric shapes, called tiles, with no overlaps and no gaps. Historically, tessellations were used in ancient Rome and in Islamic art. You may find tessellation patterns on floors, walls, paintings etc. Shown below is a tiled floor in the archaeological Museum of Seville, made using squares, triangles and hexagons	4





A craftsman thought of making a floor pattern after being inspired by the above design. To ensure accuracy in his work, he made the pattern on the Cartesian plane. He used regular octagons, squares and triangles for his floor tessellation pattern

Use the above figure to answer the questions that follow:

(i) What is the length of the line segment joining points B and F? **1**

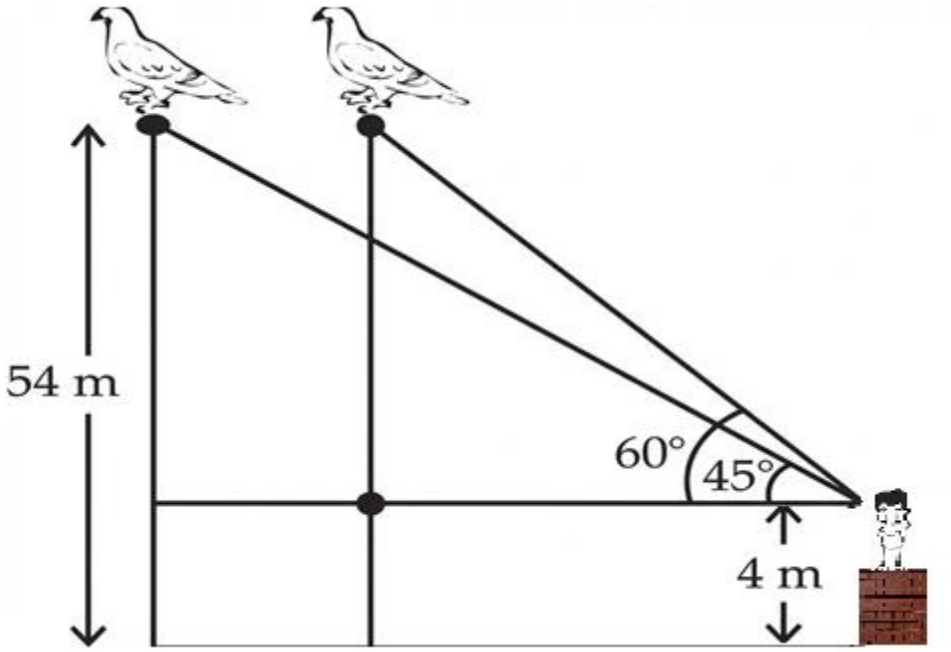
(ii) The centre 'Z' of the figure will be the point of intersection of the diagonals of quadrilateral WXOP. Then what are the coordinates of Z? **1**

(iii) What are the coordinates of the point on y axis equidistant from A and G? **2**

OR

(iii) What is the area of Trapezium AFGH? **2**

Qn No	Questions	Marks
38	A boy standing on a wall with total height (including the boy) 4 m spots a pigeon sitting on the top of a pole of height 54 m from the ground. The angle of elevation of the pigeon from the eyes of boy at any instant is 60°. The pigeon flies away horizontally in such a way that it remained at a constant height from the ground. After 8 seconds, the angle of elevation of the pigeon from the same point is 45°. Based on the above information, answer the following question: (Take $\sqrt{3} = 1.73$)	4



(i) Find the distance of first position of the pigeon from the eyes of the boy. **1**

(ii) Find the distance between the boy and the pole. **1**

(iii) How much distance the pigeon covers in 8 seconds? **2**

OR

(iv) Find the speed of the pigeon. **2**