2025_26_PRE_I

EDUTECH ACADEMY
NURTURING THE FUTURE....

SET : 02

— SCHOOL SECTION —

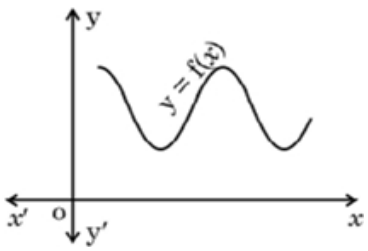
STD : X CBSE | **PRE EXAM – I** | **TIME : 3:00 Hrs**

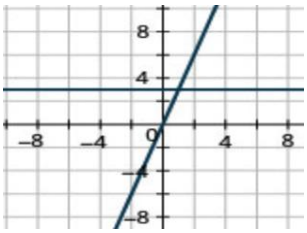
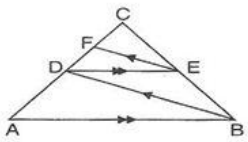
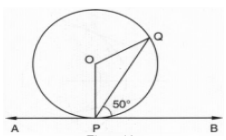
SUB : MATHS (041) | **DATE : 1st December, 2025** | **MM :80**

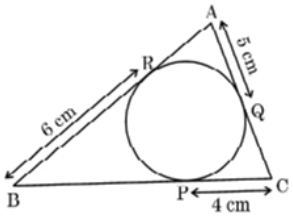
General Instructions:

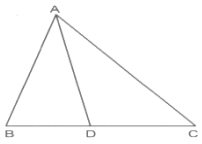
Read the following instructions carefully and follow them:

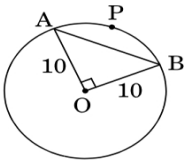
1. This question paper contains 38 questions.
2. This Question Paper is divided into 5 Sections A, B, C, D and E.
3. In Section A, Questions no. 1 - 18 are multiple choice questions (MCQs) and questions no. 19 and 20 are Assertion - Reason based questions of 1 mark each.
4. In Section B, Questions no. 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. All Questions are compulsory. However, an internal choice in 2 Questions 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.

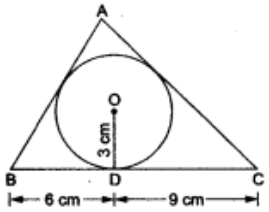
	Section A	
1	The exponent of 2 in the prime factorisation of 144, is a) 6 b) 2 c) 1 d) 4	**[1]**
2	The graph of y = f(x) is shown in the figure for some polynomial f(x).  The number of zeroes of f(x) is a) 2 b) 0 c) 3 d) 4	**[1]**

3	The number of solutions of two linear equations representing intersecting lines is/are  a) 2 b) 0 c) 1 d) ∞	**[1]**
4	If the quadratic equation $ax^2 + bx + c = 0$ has two real and equal roots, then **c** is equal to a) $\frac{b}{2a}$ b) $\frac{b^2}{4a}$ c) $\frac{-b^2}{4a}$ d) $\frac{-b}{2a}$	**[1]**
5	The 7th term of an AP is 4 and its common difference is - 4. What is its first term? a) 28 b) 20 c) 24 d) 16	**[1]**
6	XOYZ is a rectangle with vertices X(- 3, 0), O(0, 0), Y(0, 4) and Z(x, y). The length of its each diagonal is a) 5 units b) 4units c) $x^2 + y^2$ units d) X	**[1]**
7	A line intersects the y - axis and x - axis at the points P and Q, respectively. If (2, –5) is the mid - point of PQ, then the coordinates of P and Q are, respectively a) (0, – 5) and (2, 0) b) (0, – 10) and (4, 0) c) (0, 10) and (– 4, 0) d) (0, 4) and (– 10, 0)	**[1]**
8	We have, $AB \mid\mid DE$ and $BD \mid\mid EF$. Then,  a) $AC^2 = BC \,.\, DC$ b) $AB^2 = AC \,.\, DE$ c) $BC^2 = AB \,.\, CE$ d) $DC^2 = CF \times AC$	**[1]**
9	In Figure, APB is a tangent to a circle with centre O at point P. If∠ QPB = 50°, then the measure of ∠ POQ is  a) 140^o b) 120^o c) 150^o d) 100^o	**[1]**

10	In the given figure, the perimeter of△ ABC is:  a) 15 cm b) 45 cm c) 30 cm d) 60 cm	**[1]**
11	$\frac{\sin\theta}{1+\cos\theta}$ is equal to a) $\frac{1-\cos\theta}{\sin\theta}$ b) $\frac{1-\sin\theta}{\cos\theta}$ c) $\frac{1-\cos\theta}{\cos\theta}$ d) $\frac{1+\cos\theta}{\sin\theta}$	**[1]**
12	$1+\frac{\cot^2\alpha}{1+\operatorname{cosec}\alpha}=$ a) $\operatorname{cosec}\alpha$ b) $\tan\alpha$ c) $\sec\alpha$ d) $\sin\alpha$	**[1]**
13	If the height of a tower and the distance of the point of observation from its foot, both, are increased by 10%, then the angle of elevation of its top a) Falls b) increases c) remains unchanged d) decreases	**[1]**
14	Find the area of a sector of a circle of radius 28 cm and central angle 45^o. a) 318 cm^2 b) 308 cm^2 c) 208 cm^2 d) 305 cm^2	**[1]**
15	The length of a minute hand of a wall clock is 7 cm. What is the area swept by it in 30 minutes is a) 63 cm^2 b) 35 cm^2 c) 77 cm^2 d) 50 cm^2	**[1]**
16	If a digit is chosen at random from the digits 1, 2, 3, 4, 5, 6, 7, 8, 9, then the probability that it iseven, is a) $\frac{5}{9}$ b) $\frac{1}{9}$ c) $\frac{2}{3}$ d) $\frac{4}{9}$	**[1]**
17	The probability that it will rain on a particular day is 0.76. The probability that it will not rain on that day is a) 0 b) 0.24 c) 0.76 d) 1	**[1]**
18	In a data, if l = 60, h = 15, f_1 = 16, f_0 = 6, f_2 = 6, then the mode is a) 60 b) 67.5 c) 62 d) 72	**[1]**
19	**Assertion (A):** In a solid hemisphere of radius 10 cm, a right cone of same radius is removed out. The volumeof the remaining solid is 523.33 cm^3 [Take π = 3.14 and $\sqrt{2}$ = 1.4]	**[1]**

	Reason (R): Expression used here to calculate volume of remaining solid = Volume of hemisphere - Volume of cone a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	
20	**Assertion (A):** Let the positive numbers a, b, c be in A.P., then $\frac{1}{bc}, \frac{1}{ac}, \frac{1}{ab}$ are also in A.P. **Reason (R):** If each term of an A.P. is divided by a b c, then the resulting sequence is also in A.P. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	**[1]**
	Section B	
21	Given that$\sqrt{2}$ is irrational, prove that (5 + 3 $\sqrt{2}$) is an irrational number. **OR** Prove that (7 - $2\sqrt{3}$) is an irrational number, given that $\sqrt{3}$ is an irrational number.	**[2]**
22	In Fig. check whether AD is the bisector of$\angle A$ of ΔABC ifAB = 5 cm, AC = 10 cm, BD = 1.5 cm and CD = 3.5 cm  	**[2]**
23	Prove that the perpendicular at the point of contact of the tangent to a circle passes through the centre.	**[2]**
24	Prove the trigonometric identity: $$\frac{\tan^2 A}{1+\tan^2 A}+\frac{\cot^2 A}{1+\cot^2 A}=1$$ **OR** Prove the trigonometric identity:$\frac{1}{1-\sin\theta}+\frac{1}{1+\sin\theta}=2\sec^2\theta$	**[2]**

25	In Figure, a chord AB of a circle of radius 10 cm subtends a right angle at the centre.  Find 1. Area of sector OAPB 2. Area of minor segment APB. (Useπ = 3.14)	**[2]**
	Section C	
26	A shopkeeper has 120 litres of petrol, 180 litres of diesel and 240 litres of kerosene. He wants to sell oil by filling the three kinds of oils in tins of equal capacity. What should be the greatest capacity of such a tin?	**[3]**
27	If one zero of the polynomial $2x^2 + 3x + \lambda$ is $\frac{1}{2}$, find the value of λ and other zero.	**[3]**
28	100 surnames were randomly picked up from a local telephone directory and the frequency distribution of the number of letters in the English alphabets in the surnames was obtained as follows: Number of letters: 1-4 | 4-7 | 7-10 | 10-13 | 13-16 | 16-19 Number of surnames: 6 | 30 | 40 | 16 | 4 | 4 Determine the median number of letters in the surnames. Find the mean number of letters in the surnames? Also, find the modal size of the surnames.	**[3]**
29	A man invested an amount at 12% per annum simple interest and another amount at 10% per annum simple interest. He received an annual interest of₹ 2600. But, if he had interchanged the amounts invested, he would have received ₹ 140 less. What amounts did he invest at the different rates? **OR** A part of monthly hostel charge is fixed and the remaining depends on the number of days one has taken food in the mess. When Swati takes food for 20 days, she has to pay Rs 3,000 as hostel charges whereas Mansi who takes food for 25 days pays Rs 3,500 as hostel charges. Find the fixed charges and the cost of food per day.	**[3]**
30	If $a\cos^3\theta + 3a\cos\theta\sin^2\theta = m$, $a\sin^3\theta + 3a\cos^2\theta\sin\theta = n$, prove that $(m+n)^{2/3} + (m-n)^{2/3} = 2a^{2/3}$	**[3]**

31	Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that ∠ PTQ = 2 ∠ OPQ. **OR** In the given figure, a triangle ABCis drawn to circumscribe a circle of radius 3 cm such that the segmentsBD and DC into which BC is dividedby the point of contact D, are oflengths 6 cm and 9 cm respectively. If the area of△ ABC = 54 cmthen findthe lengths of sides AB and AC.  	**[3]**
	Section D	
32	The following table gives the monthly consumption of electricity of 100 families: | Monthly Consumption (in units)	130 - 140	140 - 150	150 - 160	160 - 170	170 - 180	180 - 190	190 - 200
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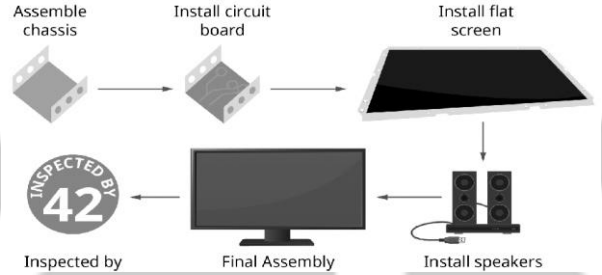
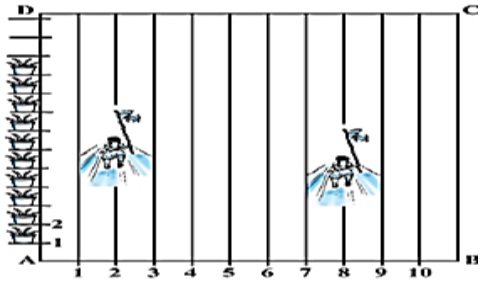
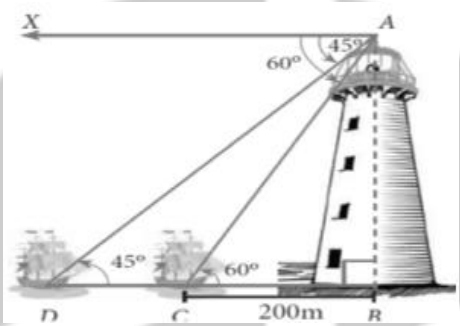
Number of families	5	9	17	28	24	10	7 | Find the median of the above data.	**[5]**
33	Dand E are points on the sides AB and AC respectively ofΔ ABC such that $DE \parallel BC$ and divides Δ ABC into two parts, equal in area, Find $\frac{BD}{AB}$.	**[5]**
34	If (- 5) is a root of the quadratic equation$2x^2 + px + 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots, then find the values of p and k. **OR** Represent the situationin the form of the quadratic equation: A train travels a distance of 480 kmat a uniform speed. If the speed had been 8 km/hr less, then it would have taken 3 hours more to cover the same distance. We need to find the speed of the train.	**[5]**
35	A solid is in the shape of a right - circular cone surmounted on a hemisphere, the radius of each of them is being 3.5 cm and the total height of solid is 9.5 cm. Find the volume of the solid. **OR**	**[5]**

	From a cubical piece of wood of side 21 cm, a hemisphere is carved out in such a way that the diameter of the hemisphere is equal to the side of the cubical piece. Find the surface area and volume of the remaining piece.	
	Section E	
36	**Read the following text carefully and answer the questions that follow:** Elpis Technology is a laptop manufacturer. The company works for many branded laptop companies and also provides them with spare parts.Elpis Technologyproduced 6000 units in 3rd year and 7000 units in the 7th year.  Assuming that production increases uniformly by a fixed number every year. 1. Find the production in the 1st year. (1) 2. Find the production in the 5th year. (1) 3. Find the total production in 7 years. (2) **OR** Find in which year 10000 units are produced? (2)	**[4]**
37	**Read the following text carefully and answer the questions that follow:** To conduct Sports Day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder at a distance of 1 m each. 100 flower pots have been placed at a distance of 1 m from each other along AD, as shown in Fig. Sarika runs the distance AD on the 2nd line and posts a green flag. Priya runs the distance AD on the eighth line and posts a red flag. (take the position of feet for calculation)  	**[4]**

	1. What co - ordinates you will use for Green Flag? (1) 2. What is the distance between the green flag and the red flag? (1) 3. If Monika wants to post a blue flag adjacently in between these two flags. Where she will post a blue flag? (2) **OR** What is the distance between green and blue flag? (2)	
38	**Read the following text carefully and answer the questions that follow:** A man is watching a boat speeding away from the top of a tower. The boat makes an angle of depression of 60 ^{o} with the man's eye when at a distance of 200 m from the tower. After 10 seconds, the angle of depression becomes 45 ^{o} .  1. What is the approximate speed of the boat (in km/hr), assuming that it is sailing in still water? (1) 2. How far is the boat when the angle is 45^o ? (1) 3. What is the height of tower? (2) **OR** As the boat moves away from the tower, angle of depression will decrease/increase? (2)	**[4]**

....All The Best....