● केंद्रीय विद्यालय संगठन, बेंगलुरु संभाग

KENDRIYA VIDYALAYA SANGATHAN, BENGALURU REGION

प्रथम प्री-बोर्ड परीक्षा २०२५-२६

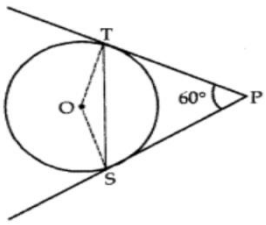
FIRST PRE-BOARD EXAMINATION-2025-26

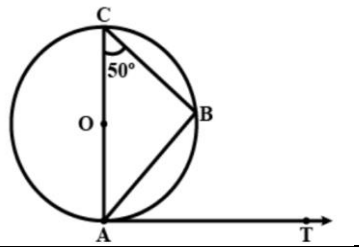
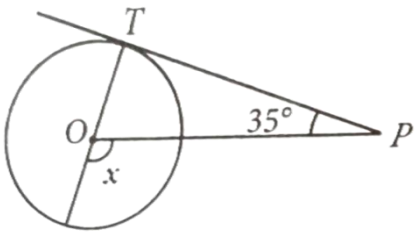
Class: X **Max Marks: 80**
Subject: MATHEMATICS (BASIC) **Time: 3 hrs**
CODE : 241

Instructions:

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, Question numbers 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, Question numbers 21-25 are very short answer (VSA) type questions, carrying 02 marks each.**
5. **In Section C, Question numbers 26-31 are short answer (SA) type questions, carrying 03 marks each.**
6. **In Section D, Question numbers 32-35 are long answer (LA) type questions, carrying 05 marks each.**
7. **In Section E, Question numbers 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 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. Take $\pi = \frac{22}{7}$**
10. **Use of calculators is not allowed.**

	SECTION - A	
	(Multiple Choice Questions)	
1.	A quadratic polynomial whose one zero is 6 and sum of the zeroes is 0 is (A) x^2-6x+2 (B) x^2-36 (C) x^2-6 (D) x^2-3	1
2.	Two alarm clocks ring their alarms at regular intervals of 50 seconds and 48 seconds .If they first beep together at 12 noon,at what time will they beep again . (A) 12:20pm (B) 12:12pm (C) 12:11pm (D) 12:10pm	1
3.	Let the emperical relationship between the three measures of central tendency be a(Median) =Mode +b(Mean),then 2b+3a = (A)10 (B) 13 (C)12 (D)14	1

4.	Three numbers are in an AP ,having sum 24, its middle term is (A) 6 (B) 3 (C)8 (D) 2	1
5.	If a pair of linear equations is inconsistent, then the two lines will be (A) intersecting or coincident (B) always coincident (C) always intersecting (D) always parallel	1
6.	In ΔABC and ΔDEF , $\frac{AB}{DE} = \frac{BC}{FD}$ then ΔABC ~ ΔEDF , if (A)∠B=∠E (B)∠A=∠D (C)∠B=∠D (D)∠A=∠F	1
7.	The 10th term of the AP $\sqrt{2}$,$\sqrt{8}$, $\sqrt{18}$,----- is (A) $\sqrt{162}$ (B) $\sqrt{288}$ (C) $\sqrt{242}$, (D) $\sqrt{200}$	1
8.	In a family with three children, the probability of having at least 2 girls is (A) $\frac{1}{2}$ (B) $\frac{1}{4}$ (C) $\frac{3}{8}$ (D) $\frac{2}{3}$	1
9.	Consider the following distribution: <table><tr><td>Class</td><td>0-6</td><td>6-12</td><td>12-18</td><td>18-24</td><td>24-30</td></tr><tr><td>Frequency</td><td>10</td><td>12</td><td>15</td><td>8</td><td>15</td></tr></table>The median class is (A) 6-12 (B)18-24 (C) 12-18 (D) 24-30	1
10.	If PS and PT are the tangents from an external point P such that PS =10 cm and ∠SPT= 60^0 ·Find the length of chord ST.  (A) 4cm (B) 7 cm (C) 10 cm (D) 9 cm	1
11.	If cos A = 4/5,then the value of cot A is (A) $\frac{4}{3}$ (B) $\frac{3}{5}$ (C) $\frac{3}{4}$ (D) $\frac{1}{8}$	1

12.	In the figure, AB is a chord of a circle and AOC is its diameter such that $\angle ACB=50^0$.If AT is the tangent to the circle at the point A, then $\angle BAT$ is equal to (A) 65^0 (B) 50^0 (C) 60^0 (D) 40^0  	1
13.	If $\Delta ABC \sim \Delta PQR$, perimeter of ΔABC=32 cm, perimeter of ΔPQR=48cm and PR=6 cm, then the length of AC is (A) 9cm (B) 18cm (C) 8cm (D)4cm	1
14.	One year ago , a man was 8 times as old as his son. Now his age is equal to the square of his son's age. The present ages are (A) 7 years,49 years (B) 5 years,25 years (C) 1 year,50 years (D) 6 years,49 years	1
15.	The perimeter of a sector of angle 45^0 of a circle with radius 7cm is (A)19cm (B)19.5cm (C)$\frac{19}{3}$cm (D)77cm	1
16.	If the probability of an event is p, then the probability of its complementary event is (A) 1-p (B) p-1 (B) P (D) 1-1/P	1
17.	If tan 5A= sin 45^0 cos45^0 +sin30^0, then value of A is (A) 0^0 (B) 30^0 (C) 9^0 (D) 15^0	1
18.	In the given figure, if PT is tangent to a circle with centre O and $\angle TPO=35^0$, then the value of x is  (A) 110^0 (B) 115^0 (C) 120^0 (D) 125^0	1

(**Assertion – Reason based questions)**

In question numbers **19** and **20**,a statement of Assertion(A) is followed by a statement of Reason(R). Choose the correct option.

(a) Both Assertion and Reason are correct and Reason is the correct explanation of Assertion.
(b) Both Assertion and Reason are correct but Reason is not correct explanation of Assertion. .
(c) Assertion is true, Reason is false.
(d) Assertion is false, Reason is true.

19.	**Assertion (A)**: At a point P of a circle with centre O and radius 12 cm , a tangent PQ of length 16 cm is drawn.Then OQ=18cm. **Reason (R):**The tangent at any point of a circle is perpendicular to the radius through the point of contact.	1
20.	**Assertion (A)**: ΔABC and ΔPQR are congruent triangles, then they are also similar triangles. **Reason (R)**: All congruent triangles are similar but the similar triangles need not be congruent.	1
	SECTION B	
21.	**(a)** Find the smallest number which is divisible by both 644 and 462. **OR** **(b)**The LCM and HCF of two numbers is 5665 and 103 respectively. If one of the numbers is 515, then find the other number.	2
22.	Find the coordinate of the point which divides the line segment joining the points (-4,6) and (3,-8) in the ratio 3:2 internally.	2
23.	If α and β are the zeroes of the polynomial x^2-5x+k such that α-β =1, find the value of k.	2
24.	Find the value of k for which the quadratic equation $(3k+1)x^2 +2(k+1)x +1=0$ has real and equal roots.	2
25.	**(a)** If 3tan θ =4, evaluate $\frac{3\sin\theta+2\cos\theta}{3\sin\theta-2\cos\theta}$ **OR** **(b)** If sin(A-B)= $\frac{1}{2}$ and cos (A+B) = $\frac{1}{2}$,0^0 <A+B< 90^0 and A > B, then find the values of A and B	2
	SECTION C	
26.	Prove that $\sqrt{3}$ is an irrational number.	3
27.	**(a)** The length of 40 leaves of a plant are measured correct to nearest millimetre, and the data obtained is represented in the following table.	3

Length	118-126	127-135	136-144	145-153	154-162	163-171	172-180

(in mm)							
Number of leaves	3	5	9	12	5	4	2

Find the mean length of the leaves.

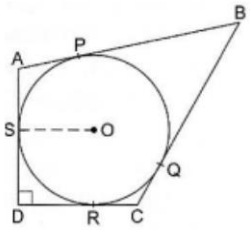
OR

(b) Raman has an apple orchard with 90 apple trees. A data on number of apples on each tree is collected and organised as a grouped distribution as shown here.

Number of apples	40-60	60-80	80-100	100-120	120-140	140-160	160-180
Number of trees	12	11	14	16	13	15	9

Find the median of the above data.

28. In the given figure, a circle is inscribed in a quadrilateral ABCD touching its sides AB, BC, CD and AD at P, Q, R and S respectively. If the radius of the circle is 10 cm, BC =38 cm, PB= 27 cm and AD ⊥ CD, then find the length of CD — 3



29. The sum of the 2nd and 7th term of an A.P. is 30. If its 15th term is 1 less than twice its 8th term, then find the A.P. — 3

30. Prove that $\sqrt{\frac{\sec\theta-1}{\sec\theta+1}}+\sqrt{\frac{\sec\theta+1}{\sec\theta-1}}=2\operatorname{cosec}\theta$ — 3

31. **(a)** Solve the following pair of equations graphically. — 3

4x - y= 4 and 3x + 2y = 14

OR

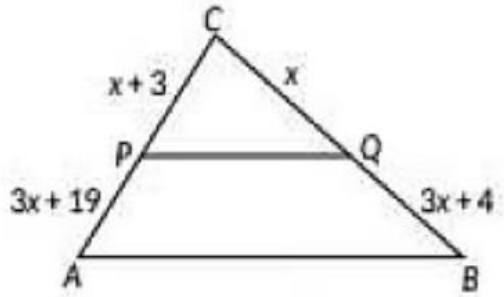
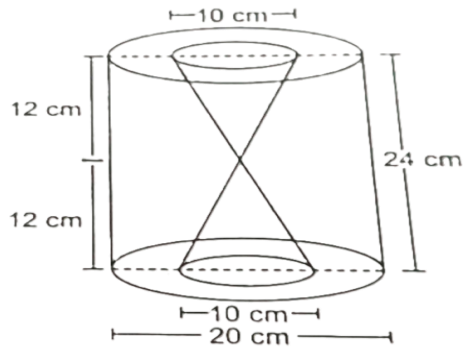
(b) On a particular day,50000 people attended a Cricket Test Match between India and Australia in Sydney Cricket Ground. Let x be the number of adults attended the cricket match and y be the number of children attended the cricket match. Cost of an adult ticket was ₹1000 while cost of a child ticket was ₹200. On that day Revenue earned by selling all 50000 tickets, was ₹42000000. Find how many adults and how many children attended the cricket match?

SECTION D

32. **(a)** As observed from the top of a 70m high light house from the sea level, the angles of depression of two ships are 30^0 and 45^0. If one ship is exactly behind the other on the same side of the light house,find the distance between the ships. (Use $\sqrt{3}$=1.73) — 5

OR

(b) The two palm trees are of equal heights and are standing opposite each other on either

	side of the river,which is 80m wide. From a point O between them on the river the angles of elevation of the top of the trees are 60^0 and 30^0, respectively. Find the height of the trees and the distances of the point O from the trees..(Use $\sqrt{3}$=1.73)	
33.	A) If a line is drawn parallel to one side of a triangle to intersect the other two sides at distinct points, prove that the other two sides are divided in the same ratio. B)Use the above theorem to find the value of x in the following question. In ΔABC, PQ ∥ AB. If PC=x+3, PA=3x+19, CQ=x and QB=3x+4 .  	5
34.	**(a)** A man buys a number of pens for ₹180.If he had bought 3 more pens for the same amount, each pen would have cost him ₹3 less. How many pens did he buy? **OR** **(b)** A bus travels at a certain average speed for a distance of 75 km and then travels a distance of 90 km at an average speed of 10km/h more than the first speed. If it takes 3 hours to complete the total journey, find its first speed.	5
35.	Find the volume of the recycled material used in making the solid as shown in figure. It is given that diameter of cylinder is 20cm and diameter of each of two equal conical cavity is 10 cm.  	5
	SECTION E	
36.	In a housing colony, the residents are installing automatic lawn sprinklers in their community garden. Each sprinkler sprays water in a sector-shaped area, not a full circle, to avoid water wastage. Each sprinkler can spray water in a sector with a central angle of 60^0 .The radius of the spray (i.e., how far the water reaches) is 12 meters. The residents want to calculate how much area one sprinkler can cover and the length of the arc for boarder planting.	1 1 2

This information will help them decide how many sprinklers are needed and where to place plants along the curved edges.

Based on the above information, answer the following questions.

(1) Find the area of the sector covered by one sprinkler.

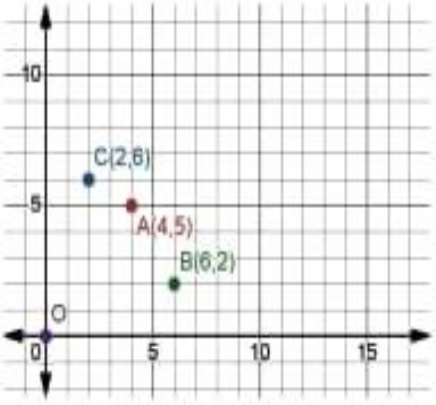
(2) What is the length of the arc (curved boundary) covered by the sprinkler spray ?

(3) (A) If 6 such sprinklers are used in different parts of the garden, then find the total area covered by them.

OR

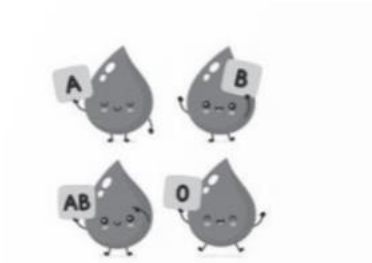
(B) If the central angle is increased to 90^0 ,then how much more area will one sprinkler cover?

37. Carpooling is the sharing of car journeys so that more than one person travels in a car,and prevents the need for others to have to drive to a location themselves. By having more people using one vehicle ,carpooling reduces each person's travel costs such as :fuel costs,tolls and the stress of driving. Carpooling is also a more environmentally friendly and sustainable way to travel as sharing journeys reduces air pollution, carbon emissions, traffic congestion on the roads,and the need for parking spaces. 1 1 2



Three friends Amar ,Bhavin and Chetanya live in societies represented by the point A (4,5) ,B(6,2) and C (2,6) respectively.They all work in offices located in a same building represented by the point O (0,0). Since they all go to same building every day,they decided to do carpooling to save money on petrol.

Based on the above information ,answer the following questions.

	(1) What is the distance between B and C? (2) If Bhavin and Chetanya planned to meet at a club situated at the midpoint of the line joining the points B and C,find the coordinates of this point . (3) (A) Which society is farthest from the office? Also find its distance from the office. **OR** (B)Out of B and C which society is nearest to A? Also find their distances.	
38.	Blood group describes the type of blood a person has.It is a classification of blood on the presence of absence of inherited antigenic substances on the surface of red blood cells.Blood types predict whether a serious reaction will occur in a blood trasfusion . In a sample of 50 people, 21 had type O blood,22 had type B and rest had AB blood group.  Based on the given information ,solve the following questions: 1. What is the probability that a person chosen at random had type O blood? 2. What is the probability that a person chosen at random had type AB group? 3. (A)What is the probability that a person chosen at random had neither type A nor type B blood group? OR (B)What is the probability that person chosen at random had either type A or type B or type O blood group?	1 1 2

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