केंद्रीय विद्यालय संगठन, बेंगलुरु संभाग

KENDRIYA VIDYALAYA SANGATHAN, BENGALURU REGION

प्रथम प्री-बोर्ड परीक्षा २०२५-२६

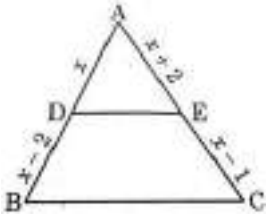
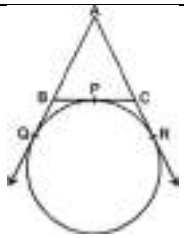
FIRST PRE-BOARD EXAMINATION-2025-26

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.	Given that HCF (45,105) = 15, then find the LCM (45,105). (a) 35 (b) 315 (c) 15 (d) 45	1
2.	Find the value of k for which the system of linear equations x + y – 4 = 0 and 2x + ky –3 = 0 has no solution. (a) -2 (b) $\neq 2$ (c) 3 (d) 2	1
3.	Which of the following is quadratic equation? (a) $x^2+3x=(x-1)^2$ (b) (x-3)(x+2)=x(4x+5) (c) $(x+1)^3 -2 = 2x^3 -5x$ (d) $x^2 +3=(x+1)^2$	1
4.	Find the common difference of the given AP : $\sqrt{2}, \sqrt{8}, \sqrt{18}, \sqrt{32}$, ... (a) 2 (b) 4 (c) 6 (d) $\sqrt{2}$	1
5.	Find a and b so that the numbers a, 7, b, 23 are in AP. (a) a= -1, b=15 (b) a=1, b=15 (c) a=3, b=-5 (d) a= 1, b=3	1

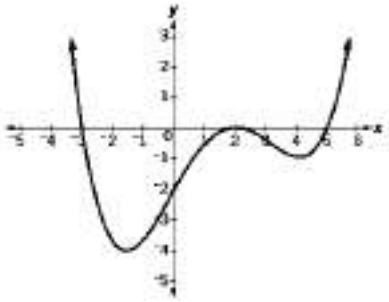
6.	All _____ triangles are similar. (a) isosceles (b) scalene (c) equilateral (d) right	1
7.	A flagpole casts a shadow 12 m long. At the same time, a 6 m high tree casts a shadow 4 m long. Find the height of the flagpole. (a) 15 m (b) 18 m (c) 16 m (d) 20 m	1
8.	In triangle ABC, DE|| BC. Find x. (a) 4 (b) 2 (c) 1 (d) 8 	1
9.	A tangent to a circle intersects it in _____ points. (a) 3 (b) 2 (c) 1 (d) infinite	1
10.	If tangents PA and PB from a point P to a circle with centre O are inclined to each other at an angle of 65^0 then ∠ AOB is equal to (a) 25^0 (b) 90^0 (c) 75^0 (d) 115^0	1
11.	Two concentric circles are of radii 13 cm and 5 cm. The length of the chord of larger circle which touches the smaller circle is_____. (a) 12 cm (b) 20 cm (c) 24 cm (d) 30 cm	1
12.	In the given figure, if length of the tangent AR is 6 cm, then find the perimeter of △ABC. (a) 6 cm (b) 10 cm (c) 8 cm (d) 12 cm 	1
13.	Sin 2A=2 SinA is true when A equals (a) 0^0 (b) 30^0 (c) 45^0 (d) 60^0	1
14.	If 3 tan θ =4, then evaluate $\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 2\cos\theta}$ (a)$\frac{11}{26}$ (b) $\frac{4}{3}$ (c) 1 (d) 0	1
15.	Area of a sector of angle θ (in degrees) of a circle with radius R is (a) $\frac{\theta}{180}$ x $2\pi R$ (b) $\frac{\theta}{180}$x πR^2 (c) $\frac{\theta}{360}$x $2\pi R$ (d) $\frac{\theta}{720}$ x $2\pi R^2$	1
16.	The mean and median of same data are 24 and 26 respectively. Find the mode of the same data. (a) 23 (b) 26 (c) 30 (d) 25	1
17.	Find the lower limit of the modal class for the following distribution: (a) 20 (b) 40 (c) 10 (d) 30	1

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	3	9	30	26	18	5

18.	Two players Sangeeta and Reshma, play a tennis match. It is known that probability of winning the match by Sangeeta is 0.62. what is the probability of winning the match by Reshma? **(a)** 0 (b) 0.38 (c) 1 (d) 0.62	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:** The graph y=f(x) is shown in figure, for the polynomial f(x). The number of zeros is 3. **Reason:** The number of zeros of the polynomial f(x) is the number of points of which f(x) cuts or touches the x axis or y-axis. 	1
20.	**Assertion:** Five face cards are removed from a deck of cards, and the remaining cards are well shuffled. Then the probability of drawing a face card is $\frac{7}{45}$. **Reason:** King, Queen and Jack are known as face cards. So, there are 12 face cards in total.	1

SECTION B

21.	**(a)** Explain why 5 x 7 x 11 x 13 + 7 x11 is a composite number? **OR** **(b)** Check whether $(12)^n$ can end with the digit 0 for any natural number n.	2
22.	Find the zeros of polynomial x^2 +7x+12 and verify the relationship between the zeros and the coefficients.	2
23.	Find the value of k for which the quadratic equation k.x. (x-3) +9 = 0 has equal roots.	2
24.	If A(3, 2) and B(1, 0) are the two vertices of a parallelogram ABCD and diagonals intersect at point O(2, -5), find the coordinates of the remaining two vertices C and D.	2
25.	**(a)** If sin (A + B) = 1 and cos (A – B) = $\frac{\sqrt{3}}{2}$; 0° < A + B ≤ 90°; A > B, then find A and B. **OR**	2

(b) Evaluate: $\frac{2\cos^2 90^0 + 4\cos^2 45^0 + \tan^2 60^0 + 3\text{cosec}^2 60^0 + 1}{3\sec 60^0 - 7/2\ \sec^2 45^0 + 2\text{cosec}\, 30^0 - 1}$

SECTION C

26. Prove that $\sqrt{3}$ is irrational. 3

27. Find the sum of the first 16 multiples of 7. 3

28. **(a)** From a stationary shop, Alok bought two pencils and three pens for ₹40 and Rahul bought one pencil and two pens for ₹ 25. Find the price of one pencil and one pen **graphically**. 3

OR

(b) Rohan noticed that the sum of his age and his grandfather's age is 88 years. Twelve years ago, his grandfather was seven times as old as Rohan was then. What are their present ages?

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

30. Prove that: $\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta\ \text{cosec}\theta$ 3

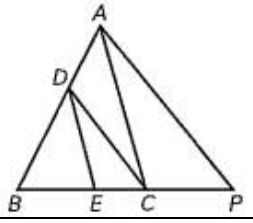
31. **(a)** Thirty women were examined in a hospital by a doctor and the number of heart beats per minute were recorded and summarized as follows. Find the mean heart beats per minute for these women. 3

Number of heart beats per minute	65-68	68-71	71-74	74-77	77-80	80-83	83-86
Number of women	2	4	3	8	7	4	2

OR

(b) The median of the following data is 16. Find the values of p and q, if the sum of all the frequencies is 70.

Class Interval	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	12	p	12	15	q	6	6	4

	SECTION D	
32.	**(a)** Seema is designing a rectangular kite for a kite festival. She wants the area of the kite to be 120 cm^2. She plans the length to be 7 cm more than its width. **(i)** Check whether it is possible to design a kite with these dimensions? **(ii)** If possible, find the length and width of the kite. Also state whether the kite will be square or rectangle. **OR** **(b)** A train travels a distance of 480km at 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.Find the speed of the train.	5
33.	A pen stand made of wood is in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid are 15 cm by 10 cm by 3.5 cm. The radius of each of the depression is 0.5 cm and the depth is 1.4 cm. find the volume of wood in the entire stand.(π =3.14)	5
34.	**(i)** Prove that "If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then other two sides are divided in the same ratio". **(ii)** In the given figure, DE || AC and DC || AP. Prove that: $\frac{BE}{EC} = \frac{BC}{CP}$ 	5
35.	**(a)** The angle of depressions of two ships from the top of a light house and on the same side of it are found to be 45^0 and 30^0. If the ships are 200 m apart, then find the height of the light house.($\sqrt{3}$ = 1.732) **OR** **(b)** A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60^0. After sometime, the angle of elevation reduces to 30^0. Find the distance travelled by the balloon during the interval.	5
	SECTION E	
36.	To connect two towns across a river, engineers plan to build a bridge. The banks of the river are represented by points P(3, 2) and Q(9, 8) on a coordinate grid, where 1 unit = 5 m. A supporting pillar (R) is to be constructed at the point dividing PQ in the ratio 2 : 1 internally. **(i)** Find the coordinates of the pillar R that divides PQ in the ratio 2:1 internally. 1 **(ii)** Find the coordinates of the midpoint M of PQ. **(iii)** (**a**) Find the length of the bridge PQ in metres. 1 **OR** 2 (**b**) If another pillar S is constructed at the midpoint of PR, find its coordinates.also find the distance between S and Q.	

37.	The school has a tall clock tower with a large circular clock. The radius of the clock is 15 m. To celebrate the school's annual festival, the decoration committee plans to install colorful LED lights along a curved section of the clock. The lights are to cover the region between 12 o'clock and 3 o'clock on the clock face. (π =3.14) **(i)** Find the area swept by the hour hand from 12 o'clock to 3 o'clock. **(ii)** Find the area of the isosceles triangle formed by the two clock hands between the region to be covered with lights. **(iii)** (**a**) Calculate the area of the minor segment. If the cost of decorative lights is ₹ 200 per m, calculate the total cost to decorate the minor segment. **OR** (**b**) Find the arc length of the curved boundary along which the lights will be installed.	1 1 2
38.	Rahul and Ravi decided to play a **fun game with two dice** at the school fair. Each player rolls **two standard dice**. The **sum of the numbers** on the dice shows how many points they earn that turn. **Special rules:** • If the sum is **7**, they get a **bonus point**. • If both dice show the **same number**, they get **double points**. • If at least one die shows a **6**, they get a **lucky spin**. **(i)** Rahul rolls the dice first. What is the probability that he gets bonus point? **(ii)** Ravi rolls the dice. What is the probability that he gets double point. **(iii)** (**a**) What is the probability of getting a lucky spin? **OR** (**b**) What is the probability that the sum of two dice is not 7?	1 1 2

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