केंद्रीय विद्यालय संगठन, बेंगलुरु संभाग

KENDRIYA VIDYALAYA SANGATHAN, BENGALURU REGION

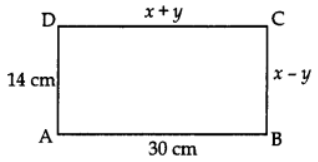
प्रथम प्री-बोर्ड परीक्षा २०२५-२६

FIRST PRE-BOARD EXAMINATION-2025-26

Class: X **Max Marks: 80**
Subject: MATHEMATICS (STANDARD) **Time: 3 hrs**
CODE : 041

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.	Let a and b be two positive integers such that $a = p^4q^5$ and $b = p^3q^4$, where p and q are prime numbers. If HCF(a,b) = $p^m q^n$ and LCM(a,b) = $p^r q^s$, then (m+n)(r+s) = (a) 15 (b) 30 (c) 63 (d) 72	1
2.	In the given figure , ABCD is a rectangle. The value of x - 2y is  (a)5 (b) 6 (c) 7 (d) 8	1
3.	If one zero of the polynomials ($ax^2 + bx + c$) is the reciprocal of the other, and ($a \neq 0$), then which of the following must be true? (a) b = c (b) $b^2 = 4ac$ (c) a = 0 (d) a = c	1
4.	The perimeters of two similar triangles are 25cm and 15 cm respectively. One side of the first triangle is 10 cm. The length of the corresponding side of the second triangle is (a) 4 cm (b) 5 cm (c) 6 cm (d) 10 cm	1

5. Sunny and Rohan were playing a number game. Sunny asked Rohan to find out two numbers such that the sum of the number and its reciprocal is $\frac{65}{8}$. Help Rohan find the numbers. (1)

(a) 4, $\frac{1}{4}$ (b) 8, $\frac{1}{8}$ (c) 2, $\frac{1}{2}$ (d) 6, $\frac{1}{6}$

6. The mid-point of the line segment joining the points P(4, 5) and Q(4, 6) lies on: (1)

(a) x-axis (b) y-axis

(c) origin (d) neither x-axis nor y-axis

7. The value of cos1°. cos2°. cos3°. cos4°. . . . . .cos90° is (1)

(a) 1 (b) 0 (c) – 1 (d) 2

8. The least number which is a perfect square and is divisible by each of 16, 20 and 50, is : (1)

(a) 1200 (b) 100 (c) 3600 (d) 2400

9. In a cricket match, a batsman hits the boundary 7 times out of the 42 balls he plays. The probability of his not hitting a boundary is : (1)

(a) $\frac{1}{6}$ (b) $\frac{1}{7}$ (c) $\frac{5}{6}$ (d) $\frac{5}{7}$

10. Hari drew a rectangle AOBC whose three vertices are A(0, 2), O(0, 0) and B(4, 0). The square of the length of its diagonal is (1)

(a) 36 (b) 20 (c) 16 (d) 4

11. For the following distribution: (1)

Class	0 - 5	5 - 10	10 - 15	15 - 20	20 - 25
Frequency	10	15	12	20	9

the sum of upper limits of the median class and modal class is

(a) 10 (b) 15 (c) 20 (d) 35

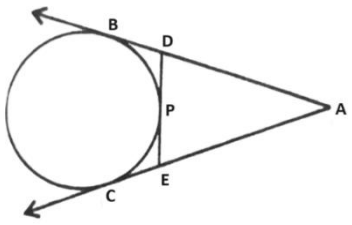
12. It is proposed to build a new circular park equal in area to the sum of areas of two circular parks of diameters 24 m and 10 m in a locality. The radius of the new park is (1)

(a) 10m (b) 13m (c) 20m (d) 24m

13. In figure, if AB = 8 cm and PE = 3 cm, then AE = (1)

(a) 11 cm (b) 7 cm

(c) 5 cm (d) 3 cm



14. If a large circular pizza is divided into 5 equal sectors, then the central angle of each sector will be : (1)

(a) 60° (b) 90° (c) 45° (d) 72°

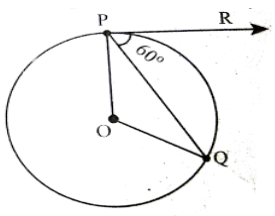
15. If $7\cos^2\theta + 3\sin^2\theta = 4$, then the value of θ is : (1)

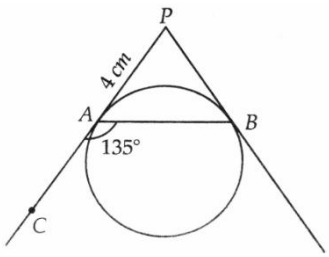
(a) 30° (b) 45° (c) 60° (d) 90°

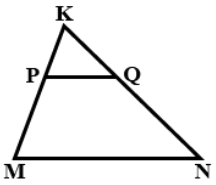
16. If PR is a tangent to the circle at and O is the centre of the circle, then ∠ POQ = (1)

(a) 120° (b) 110°

(c) 100° (d) 90°



17.	A joker's cap is in the form of cone of base radius 7 cm and height 24 cm. The area of sheet to make 10 such caps is (a) 8500cm^2 (b) 6500 cm^2 (c) 5500cm^2 (d) 3500cm^2	1
18.	A pair of dice is tossed. The probability of getting a doublet is (a) $\frac{1}{6}$ (b) $\frac{2}{6}$ (c) $\frac{3}{6}$ (d) $\frac{4}{6}$	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)**: In ΔABC, right angled at C and ∠A = ∠B, then cos A = cos B **Reason (R)**: In a triangle, equal angles have equal sides opposite to them.	1
20.	**Assertion (A):** If the HCF of two numbers is 6 and their product is 180, then their LCM is 40. **Reason(R):** For any two positive integers p and q, HCF (p, q) × LCM (p, q) = p × q.	1
	SECTION B	
21.	**(a)** Shyam had invested some money in a SIP (Systematic Investment Plan). He receives Rs.60 as interest for the first week and Rs.3 more each week than the preceding week. How much does he earn by the 20th week? **(OR)** **(b)** The 4th term of an A.P. is zero. Prove that the 25th term of the A.P. is three times its 11th term.	2
22.	AD and PS are medians of triangles ABC and PQR respectively such that ΔABD ~ ΔPQS. Prove that ΔABC ~ ΔPQR.	2
23.	If 3k = tan^2 60° - 2 sin^2 30° + 2 tan^2 45°, then find the value of k.	2
24.	In the given figure, PA and PB are tangents to a circle from an external point P such that PA = 4 cm and ∠BAC = 135°. Find the length of chord AB  	2
25.	**(a)** A horse, a cow and a goat are tied, each by ropes of length 14m, at the corners A, B and C respectively, of a grassy triangular field ABC with sides of lengths 35m, 40m and 50 m. Find the area of grass field that can be grazed by them. **(OR)** **(b)** The minute hand of a wall clock is 14 cm long. Find the area of the face of the clock described by the minute hand in 25 minutes.	2

	SECTION C	
26.	Prove that $\sqrt{3}$ is an irrational number.	3
27.	If α and β are zeroes of a polynomial $3x^2$ - 4x+1 then form a quadratic polynomial whose zeroes are α^2 and β^2	3
28.	**(a)** The taxi charges in a city comprise of a fixed charge together with charge for the distance covered. For a journey of 10 km, the charges paid is ₹75 and for a journey of 15 km, the charges paid is ₹110. How much should Rima pay if she has travelled a distance of 25 km? **(OR)** **(b)** Solve the following pair of linear equations graphically. 2x + y = 6 and 2x – y + 2 = 0. Also find the area of the triangle formed by the lines representing the given equations with the X-axis.	3
29.	From a pack of 52 playing cards, jacks, queens, kings and aces of red colour are removed. From the remaining a card is drawn at random. Find the probability that the card drawn is (i) a king or a queen (ii) a non-number card (iii) a face card.	3
30.	**(a)** Prove that: $\frac{\sin\theta-\cos\theta}{\sin\theta+\cos\theta}+\frac{\sin\theta+\cos\theta}{\sin\theta-\cos\theta}=\frac{2}{2\sin^2\theta-1}$ **(OR)** **(b)** If $\tan\theta=\frac{a}{b}$, prove that $\frac{a\sin\theta-b\cos\theta}{a\sin\theta+b\cos\theta}=\frac{a^2-b^2}{a^2+b^2}$	3
31.	Prove that the parallelogram circumscribing a circle is a rhombus.	3
	SECTION D	
32.	If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio. In the figure PQ is parallel to MN. If $\frac{KP}{PM}=\frac{4}{13}$ and KN = 20.4 cm. Find KQ 	5
33.	A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of stream.	5
34.	**(a)** Due to heavy floods in the state of Kerala in the year 2018, thousands were rendered homeless. 100 schools collectively decided to provide place and the canvas for 1500 tents and share the whole expenditure equally. The lower part of each tent is cylindrical with base radius 2.8 m and height 3.5 m and the upper part is conical with the same base radius, but of height 2.1 m. If the canvas used to make the tents costs ₹120 per m^2, find the amount shared by each school to set up the tents. **Take $\pi=\frac{22}{7}$** **(OR)** **(b)** Shalu bought a toy which was in the form of a hemisphere surmounted by a right circular cone. The height of cone was 4 cm and diameter of the base was 8 cm. Help Shalu to determine the volume of the toy. Shalu had used a cube to circumscribe the toy. Now help her find the difference of the volumes of cube and toy.	5

35. **(a)**The median of the following data is 525. Find the values of x and y, if the total frequency is 100 — 5

Class interval	Frequency
0 – 100	2
100 – 200	5
200 – 300	x
300 – 400	12
400 - 500	17
500 - 600	20
600 - 700	y
700 - 800	9
800 - 900	7
900 - 1000	4

(OR)

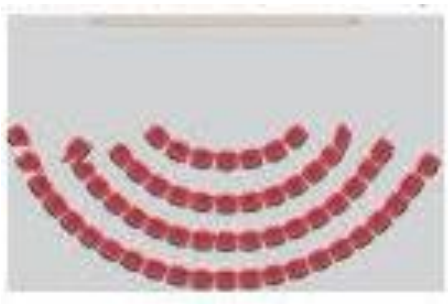
(b) During a medical check of 35 students from Class X, their weights were recorded as follows:

Weight(in Kg)	No. of students
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

Find the mean weight of students of Class X.

SECTION E

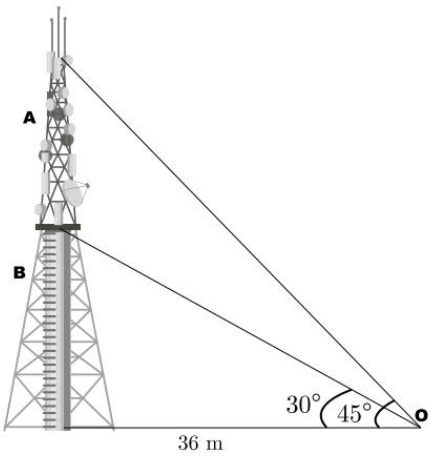
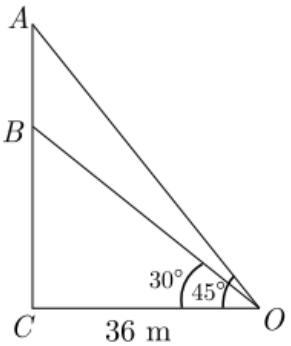
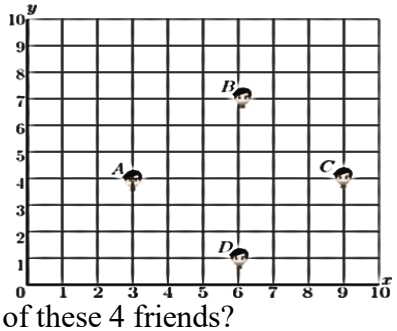
36. A school had booked an auditorium to conduct their Annual Day Celebrations. The auditorium had a capacity of 2000 people. The chairs in the auditorium are arranged in a concave shape facing towards the stage in such a way that each succeeding row has 5 seats more than the previous one. — 4



(i) If the first row has 15 seats, then how many seats will be there in 10th row?
(ii) If there are 15 rows in the auditorium, then how many seats will be there in the middle row?
(iii)**(a)** If total 1875 guests were there in the auditorium for attending the Annual Day Celebrations, then how many rows will be needed to make all of them sit?

(OR)

(iii)**(b)** If total 1250 guests were there in the auditorium for attending the Annual Day Celebrations, then how many rows will be left blank out of total 30 rows available.

37.	Radio towers are used for transmitting a range of communication services including radio and television. The tower will either act as an antenna itself or support one or more antennas on its structure, including microwave dishes. They are among the tallest human-made structures. There are 2 main types: guyed and self-supporting structures. On a similar concept, a radio station tower was built in two sections A and B. Tower is supported by wires from a point O. Distance between the base of the tower and point O is 36 m. From point O, the angle of elevation of the top of section B is 30^0 and the angle of elevation of the top of section A is 45^0.   On the basis of the above information, answer the following questions: (i) What is the height of the section B from C? (ii) How high is section A from section B? (iii)(a) What is the length of the wire structure from the point O to the top of section A? **(OR)** (iii)(b) What is the length of the wire structure from the point O to the top of section B?	4
38.	Morning assembly is an integral part of the school's schedule. Morning assembly is important for a child's development. It is essential to understand that morning assembly is not just about standing in long queues and singing prayers or national anthem, but it's something beyond just prayers. All the activities carried out in morning assembly by the school staff and students have a great influence in every point of life. Have you noticed that in school assembly you always stand in row and column and this make a coordinate system? Suppose a school have 100 students and they all assemble in prayer in 10 rows as given below:  Here A, B, C and D are four friend Amar, Bharat, Charles and Dravid. (i)What is the distance between A and B? (ii)What is the distance between A and C? (iii)(a) Check whether A is equidistant from B and D? **(OR)** (iii)(b) Which polygon will form the seating arrangement of these 4 friends?	4

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