KENDRIYA VIDYALAYA SANGATHAN, LUCKNOW REGION

PRE BOARD-2 SET 3

Class X Session 2024-25

MATHEMATICS STANDARD (Code No.041)

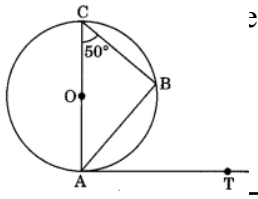
TIME: 3 hours MAX. MARKS: 80

General Instructions:

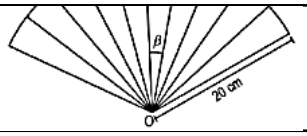
Read the following instructions carefully and follow them:

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 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.
10. Take $\pi = 22/7$ wherever required if not stated.
11. Use of calculators is not allowed.

	Section – A	
	Section A consists of 20 questions of 1 mark each.	
1	If HCF OF 144 AND 180 IS EXPRESSED IN THE FORM 13m-3,then m is a) 1 b) 2 c) 3 d) 4	1
2	A quadratic polynomial can have at most _____ zeroes. (a) 0 (b) 1 (c) 2 (d) infinite	1
3	If in the equation x + 2y = 10, the value of y is 6, then the value of x will be (a) -2 (b) 2 (c) 4 (d) 5	1
4	If (x – a) is one of the factors of the polynomial $ax^2 + bx + c$, then one of the roots of $ax^2 + bx + c = 0$ is (a) 1 (b) c (c) a (d) none of these	1
5	Equation of $(x+1)^2-x^2=0$ has number of real roots equal to: (a) 1 (b) 2 (c) 3 (d) 4	1
6	The missing terms in AP: __, 13, __, 3 are: (a) 11 and 9 (b) 17 and 9 (c) 18 and 8 (d) 18 and 9	1
7	If the points A(4,3) and B (x,5) are on the circle with centre O(2,3), then the value of x is : (a) 5 (b) 6 (c) 2 (d) 4	1
8	Ashmita and Shreya are sisters, What is the probability that both have birthday on 14th September (ignoring leap year)	1

	(a) $\frac{1}{30}$ (b) $\frac{2}{365}$ (c) $\frac{1}{366}$ (d) 1	
9	A tangent intersects the circle at: (a) One point (b) Two distinct point (c) At the circle (d) None of the above	1
10	The distance between two parallel tangents of a circle is 18 cm, then the radius of the circle is (a) 8 cm (b) 10 cm (c) 9 cm (d) 7.5 cm	1
11	If Fig., AB is a chord of the circle and AOC is its diameter such that AC is tangent to the circle at the point A, the ∠BAT is equal to (a) 65° (b) 60° (c) 50° (d) 40° 	1
12	(Sin 30°+ Cos 60°) - (Sin 60° + Cos 30°) is equal to: (a) 0 (b) $1+2\sqrt{3}$ (c) $1-\sqrt{3}$ (d) $1+\sqrt{3}$	1
13	If cos X = a/b, then sin X is equal to: (a) $(b^2-a^2)/b$ (b) (b-a)/b (c) $\sqrt{(b^2-a^2)}/b$ (d) $\sqrt{(b-a)}/b$	1
14	In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. The length of the arc is; (a) 20cm (b) 21cm (c) 22cm (d) 25cm	1
15	If the curved surface area of a solid right circular cylinder of height h and radius r is one-third of its total surface area, then (a) h = 1/3 r (b) h = ½ r (c) h = r (d) h = 2r	1
16	The base area of the cylinder is 80 sq. cm. If its height is 5cm, then its volume is (a) 200 cu.cm (b) 80 cu.cm (c) 100 cu.cm (d) 400 cu.cm	1
17	The mode and mean is given by 7 and 8, respectively. Then the median is: (a) 1/13 (b) 13/3 (c) 23/3 (d) 33	1
18	The mean of following distribution is: x_i: 11, 14, 17, 20 f_i: 3, 6, 8, 7 (a) 15.6 (b) 17 (c) 14.8 (d) 16.4	1
	DIRECTION: 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.	
19	Assertion: the probability of getting a prime number when a dice is thrown once is 2/3 Reason: prime number on a dice are 2,3,5	1
20	Assertion: If the points A(4, 3) and B(x, 5) lies on a circle with the centre O(2,3) then the value of x is 2.	1

	Reason : The mid-point of the line segment joining the points P(x1 , y1) and Q(x2 , y2) is ($\frac{x_1+x_2}{2}$, $\frac{y_1+y_2}{2}$)	
	Section – B	
	Section B Section B consists of 5 questions of 2 marks each.	
21	Prove that $3 + 2\sqrt{5}$ is irrational. Or Prove that $\sqrt{5}$ is irrational.	2
22	Write the coordinates of a point on the x-axis which is equidistant from points A(-2, 0) and B(6, 0).	2
23	Find the ratio in which y-axis divides the line segment joining the points A (5, -6) and B (-1, -4). Also find the coordinates of the point of division.	2
24	Evaluate: $3 \cos^2 60° \sec^2 30° – 2 \sin^2 30° \tan^2 60°$	2
25	A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is thrice that of a red ball, find the number of blue balls in the bag. Or One card is drawn at random from a well-shuffled deck of 52 playing cards. Find the probability that the card drawn is (i) either a red card or a king, (ii) neither a red card nor a queen.	2
	Section – C	
	Section C consists of 6 questions of 3 marks each	
26	Ravi, Seema, and Raju start preparing cards for all the people in an old age home. They complete one card in 20, 16 and 10 minutes. If all of them started together at the same time, after what time will they start preparing a new card together?	3
27	The hypotenuse of right angled triangle is 6 meters more than twice the shortest side. If the third side is 2 meters less than the hypotenuse, then find all the sides of the triangle.	3
28	If α and β are the zeros of the quadratic polynomial $2x^2 - 8x + 5$, find the value of ($\alpha + \frac{1}{\beta}$)×($\beta + \frac{1}{\alpha}$). Or How many zeros does the polynomial $(x – 3)^2 – 4$ have? Also, find its zeroes.	3
29	Prove that, if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.	3
30	If $\sin \theta + \cos \theta = \sqrt{3}$, then prove that $\tan \theta + \cot \theta = 1$. Or If $\tan \theta + \cot \theta = 5$, find the value of $\tan^2 \theta + \cot^2 \theta$.	3
31	The figure below is a part of a circle with centre O. Its area is $\frac{1250\pi}{9}$ cm^2 and the 10 sectors are identical. Find the value of β.	3

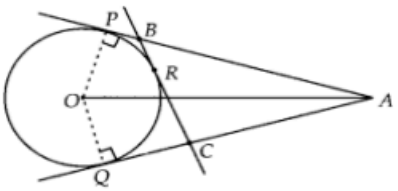


Section – D

Section D consists of 4 questions of 5 marks each

32 Solve the following pair of equations graphically: 2x+3y=12, x-y-1=0. Shade the region between the two lines represented by the above equations and the X-axis. 5

33 A is a point at a distance 13 cm from the Centre 0 of a circle of radius 5 cm. AP and AQ are the tangents to the circle at P and Q. If a tangent BC is drawn at a point R lying on the minor arc PQ to intersect AP at B and AQ at C, find the perimeter of the ΔABC. 5



34 At a point A, 20 metres above the level of water in a lake, the angle of elevation of a cloud is 30°. The angle of depression of the reflection of the cloud in the lake, at A is 60°. Find the distance of the cloud from A. 5

Or

An aero plane flying at a height of 9000 m from the ground passes vertically above another aeroplane at an instant, when the angles of elevation of the two planes from the same point on the ground are 60° and 30° respectively. Find the vertical distance between the aero planes at that instant.

35 The median of the following data is 868. Find the values of x and y, if the total frequency is 100. 5

Class	Frequency
800-820	7
820-840	14
840-860	x
860-880	25
880-900	y
900-920	10
920-940	5

Or

The distribution below gives the makes of 100 students of a class, if the median makes are 24, find the frequencies f_1 and f_2.

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
No. Of Student	4	6	10	F_1	25	F_2	18	5

	Section – E	
	Section E consists of 3 case study based questions of 4 marks each	
36	India is competitive manufacturing location due to the low cost of manpower and strong technical and engineering capabilities contributing to higher quality production runs. The production of TV sets in a factory increases uniformly by a fixed number every year. It produced 16000 sets in 6th year and 22600 in 9th year.  **Based on the above information, answer the following questions:** a). Find the production during 8th year. b). Find the production during first 3 years. c). In which year, the production is Rs 29,200. Or Find the difference of the production during 7th year and 4th year.	4 (1+1+2)
37	A scale drawing of an object is the same shape at the object but a different size. The scale of a drawing is a comparison of the length used on a drawing to the length it represents. The scale is written as a ratio. The ratio of two corresponding sides in similar figures is called the scale factor Scale factor= length in image / corresponding length in object If one shape can become another using revising, then the shapes are similar. Hence, two shapes are similar when one can become the other after a resize, flip, slide or turn. In the photograph below showing the side view of a train engine. Scale factor is 1:200 This means that a length of 1 cm on the photograph above corresponds to a length of 200cm or 2 m, of the actual engine. The scale can also be written as the ratio of two lengths.	4 (1+1+2)

a) If the length of the model is 11cm, then find the overall length of the engine in the photograph above, including the couplings.

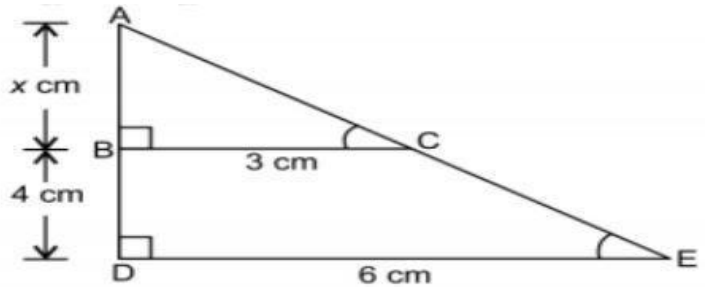
b) What is the actual width of the door if the width of the door in photograph is 0.35cm?

c) If two similar triangles have a scale factor 5:3 which statement regarding the two triangles is true?

a) The ratio of their perimeters is 15:1
b) Their altitudes have a ratio 25:15
c) Their medians have a ratio 10:4
d) Their angle bisectors have a ratio 11:5

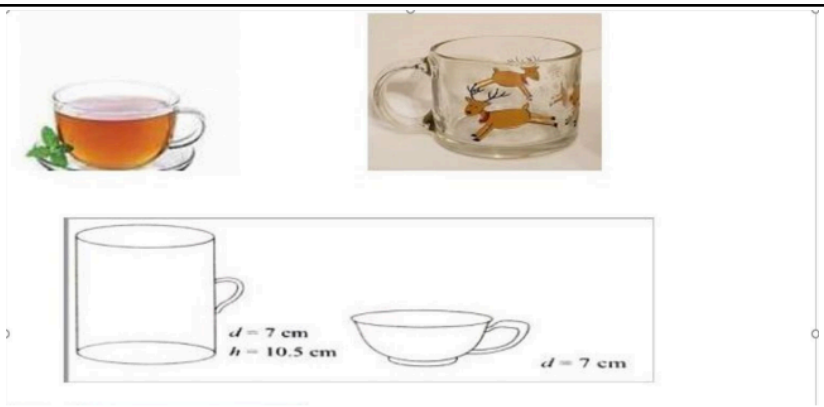
Or

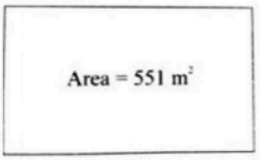
The length of AB in the given figure:

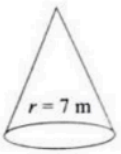


38 Adventure camps are the perfect place for the children to practice decision making for themselves without parents and teachers guiding their every move. Some students of a school reached for adventure at Sakleshpur. At the camp, the waiters served some students with a welcome drink in a cylindrical glass and some students in a hemispherical cup whose dimensions are shown below. After that they went for a jungle trek. The jungle trek was enjoyable but tiring. As dusk fell, it was time to take shelter. Each group of four students was given a canvas of area $551m^2$. Each group had to make a conical tent to accommodate all the four students. Assuming that all the stitching and wasting incurred while cutting, would amount to $1m^2$, the students put the tents. The radius of the tent is 7m.

4 (1+1+2)







a). Find the volume of cylindrical cup.
b). Find the volume of hemispherical cup.
c). Which container had more juice and by how much?

Or

How much space on the ground is occupied by each student in the conical tent.