KENDRIYA VIDYALAY SANGATHAN, ERNAKULAM REGION
PRE BOARD Ist, 2026-27
CLASS X
MATHEMATICS BASIC (241)

DURATION- 3 HOURS **MAXIMUM MARKS- 80**

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) This question paper contains 38 questions. **All** questions are compulsory.

(ii)This question paper is divided into five Sections - **A, B, C, D and E**.

(iii) In **Section A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and **20** are Assertion-Reason based questions of **1** mark each.

(iv) In **Section B**, Questions no. **21** to **25** are very short answer (VSA) type questions, carrying **2** marks each.

(v) In **Section C**, Questions no. **26** to **31** are short answer (SA) type questions, carrying **3** marks each.

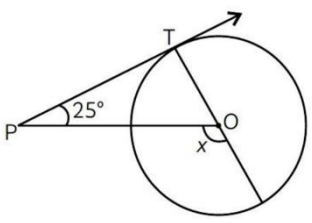
(vi) In **Section D**, Questions no. **32** to **35** are long answer (LA) type questions, carrying **5** marks each.

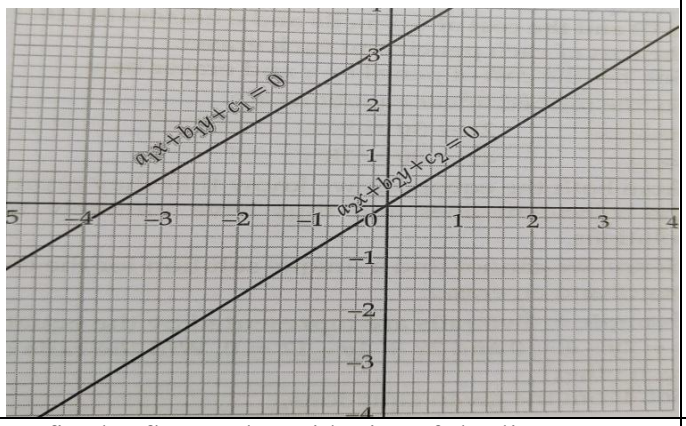
(vii) In **Section E**, Questions no. **36** to **38** are case study based questions carrying **4** marks each. Internal choice is provided in **2** marks questions in each case study.

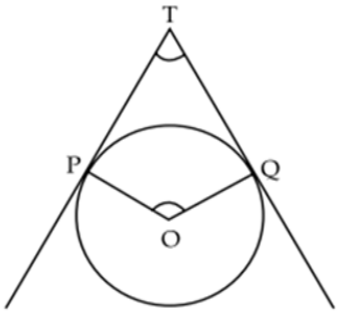
(viii) There is no overall choice. However, an internal choice has been provided in 1 questions in Section B, 2 questions in Section C, 2 questions in Section D and 3 questions in Section E.

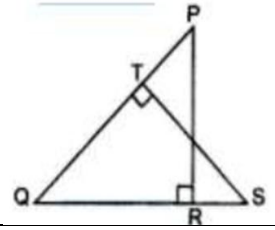
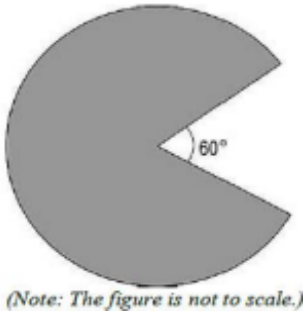
(ix)Draw neat diagrams wherever required. Take $\pi = \frac{22}{7}$ wherever required, if not stated.

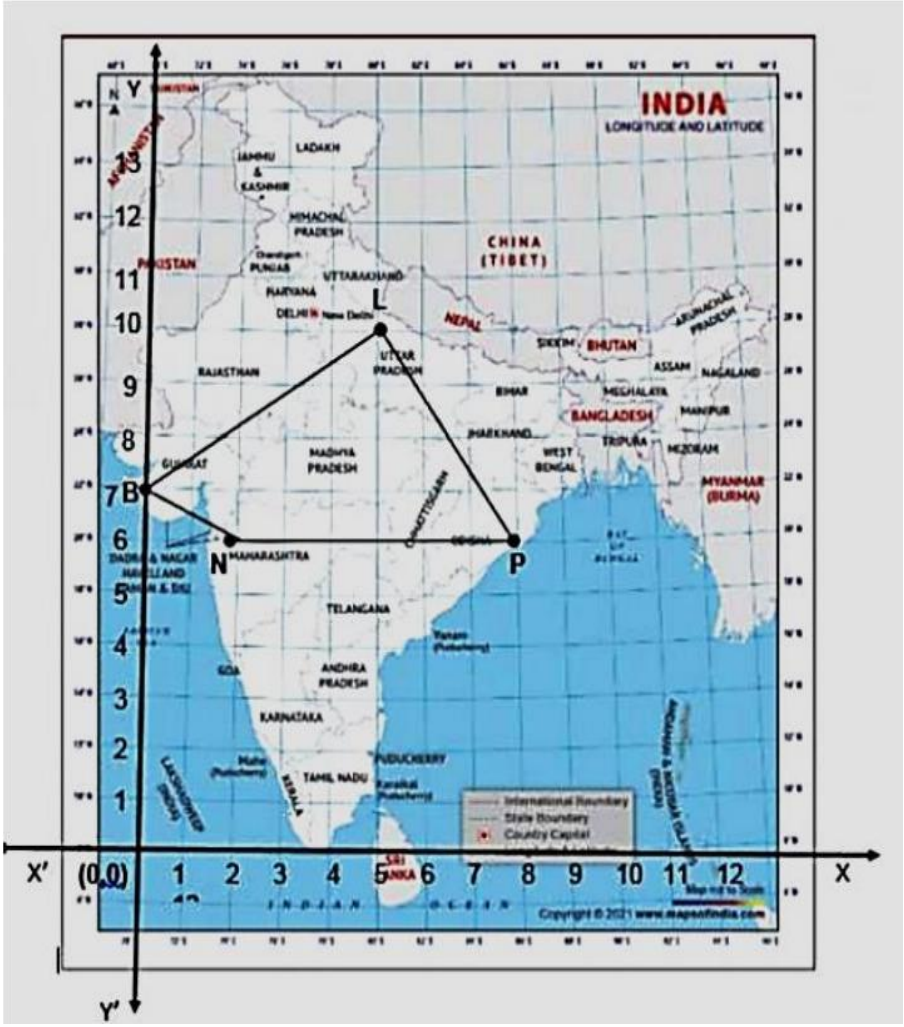
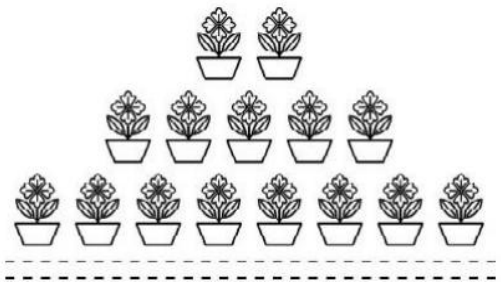
(x) Use of calculator is **not** allowed.

	SECTION-A	
1.	The LCM of smallest 2-digit number and smallest composite number is (a) 12 b)20 (c) 4 (d)40	**1**
2.	If the circumference of a circle increases from 2π to 4π, then its area becomes ----- of the original area (a) half (b) double (c) three times (d) four times	**1**
3.	$(\sec^2\theta - 1)(\operatorname{cosec}^2\theta - 1)$ is equal to: a) –1 b) 1 c) 0 d) 2	**1**
4.	In the given figure, PT is a tangent at T to the circle with centre O. If ∠TPO = 25°, then x is equal to: a) 25° b) 65° c) 90° d) 115° 	**1**
5.	Two triangles are similar if there corresponding sides are: a)Proportional b) not proportional c) equal d) none of these	**1**
6.	If the zeroes of the quadratic polynomial $x^2 + (a + 1)x + b$ are 2 and -3, then (a) a = -7, b = -1 (b) a = 5, b = -1 (c) a = 2, b = -6 (d) a = 0, b = -6	**1**

7.	The quadratic equation $x^2 + 3x - 2\sqrt{2} = 0$ has (a) Two distinct real roots (b) Two equal real roots (c) No real roots (d) More than 2 real roots	**1**
8.	If a sector angle subtended at the centre by an arc of a circle of radius 14cm is 30^0. The length of arc is (a) $\frac{22}{7}$cm (b) $\frac{154}{3}$cm (c) $\frac{22}{3}$cm (d) $\frac{154}{7}cm$	**1**
9.	A solid piece of iron in the form of a cuboid of dimensions 49 cm x 33 cm x 24 cm, is moulded to form a solid sphere. The radius of the sphere is a) 21 cm c) 23 cm b) 25 cm d) 19 cm	**1**
10.	If the distance between the points (2, –2) and (–1, x) is 5, one of the values of x is (a) –2 (b) 2 (c) –1 (d) 1	**1**
11.	The 21st term of an AP whose first two terms are -3 and 4, is (a) 17 (b) 137 (c) 143 (d) -143	**1**
12.	The value of $2\sqrt{2}cos45°sin30° + 2\sqrt{3}cos30°$ is (a) 1 (b) $\sqrt{3}$ (c) 4 (d) $\sqrt{2}$	**1**
13.	If α and β are the zeroes of the polynomial $2x^2 - 13x + 6$, then $\alpha + \beta$ is equal to (a) -3 (b) 3 (c) $\frac{13}{2}$ (d) $-\frac{13}{2}$	**1**
14.	The given pair of linear equations is non-intersecting. Which of the following statement is true? a) $a_1/a_2 = b_1/b_2 = c_1/c_2$ b) $a_1/a_2 \neq b_1/b_2 = c_1/c_2$ c) $a_1/a_2 = b_1/b_2 \neq c_1/c_2$ d) $a_1/a_2 \neq b_1/b_2 \neq c_1/c_2$ 	**1**
15.	To prepare a campaign flag, 10 students are asked to fix the flag at the midpoint of the line segment joining points A(2, -2) and B(4, 8).What are the coordinates of the midpoint where the flag should be placed? a) (6, 6) c) (3,5) b) (1, 5) d) (3,3)	**1**
16.	$\Delta ABC \sim \Delta DEF$ are similar and their perimeter are 32cm and 24cm respectively, if AB =10 then DE is equal to: a) 8 b) 7.5 c) 6 d) 5	**1**

17.	In Fig. TP and TQ are two tangents from an external point T to a circle with centre O. If $\angle POQ=110^0$, then $\angle PTQ$ is: (a) 60^0 (b) 70^0 (c) 80^0 (d) 90^0  	**1**
18.	In triangles ABC and DEF, $\angle B = \angle E$, $\angle F = \angle C$, and AB = 3DE. Then the two triangles are (a) congruent but not similar (b) similar but not congruent (c) neither cogruent nor similar (d) congruent as well as similar	**1**
	Direction: **In the following questions, a statement of Assertion(A) is followed by a statement of Reason(R).** **(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 but 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 (A)**: For $0 < \theta \leq 90^0$, $\text{cosec}\theta - \cot\theta$ and $\text{cosec}\theta + \cot\theta$ are reciprocal of each other. **Reason (R)**: $\text{cosec}^2\theta - \cot^2\theta = 1$	**1**
20.	**Assertion (A)**: If a wire of length 22 cm is bent in the shape of a circle, then the area of circle so formed is 40 cm^2 **Reason(R):** Circumference of the circle= Length of the wire.	**1**
	SECTION-B	
21.	If $\tan(A + B) = \sqrt{3}$ and $\tan(A - B) = \frac{1}{\sqrt{3}}$; $0° < A + B \leq 90°$ $A > B$, find A and B.	**2**
22.	(a) Find a relation between x and y such that the point P(x, y) is equidistant from the points A (–5, 3) and B (7, 2). **OR** (b) Find the point on the x -axis which is equidistant from the points A(- 2, 3) and B(5, 4).	**2**
23.	Find the greatest 3-digit number which is divisible by 18, 24 and 36.	**2**
24.	Evaluate : $\frac{sec^2 45° - \tan^2 45°}{\sin^2 45°}$	**2**
25.	Prove that tangents drawn at the end of the points of a diameter are parallel.	**2**
	SECTION-C	
26.	Prove that the parallelogram circumscribing a circle is rhombus OR Prove that the tangents drawn from an external point are equal in length.	**3**
27.	Prove that $\sqrt{5}$ is Irrational.	**3**
28.	D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB.CD$	**3**

	OR In the figure, PQR and QST are two right triangles, right angled at R and T respectively. Prove that QR × QS = QP × QT.  	
29.	Prove that $(\sin\theta + \text{Cosec}\theta)^2 + (\cos\theta + \sec\theta)^2 = 7 + \tan^2\theta + \cot^2\theta$	**3**
30.	If α and β are zeroes of $x^2-(k+6)x+2(2k-1)$ find the value of k if $(\alpha + \beta) = \frac{1}{2}\alpha\beta$	**3**
31.	If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes $\frac{1}{2}$ if we only add 1 to the denominator. What is the fraction?	**3**
	SECTION-D	
32.	Prove that, if a line segment 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.	**5**
33.	A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the original speed of the train.	**5**
34.	(a) The angle of elevation of the top of a tower 30 m high from the foot of another tower in the same plane is 60^0 and the angle of elevation of the top of the second tower from the foot of the first tower is 30^0 . Find the distance between the two towers and also the height of the other tower. **OR** (b) From the top of a tower 100 m high, a man observes two cars on the opposite sides of the tower with angles of depression 30^0 and 45^0 respectively. Find the distance between the two cars.(Use $\sqrt{3} = 1{\cdot}73$)	**5**
35.	Wasim made a model of Pac-Man, after playing the famous video game of the same name. The area of the model is 120π cm^2. Pac-Man's mouth forms an angle of 60° at the centre of the circle. A picture of the model is shown below.  *(Note: The figure is not to scale.)* Wasim wants to decorate the model by attaching a colored ribbon to the entire boundary of the shape. What is the minimum length of the ribbon required in terms of π?	**5**
	SECTION-E	

36.	In a GPS, the lines that run east-west are known as lines of latitude, and the lines running northsouth are known as lines of longitude. The latitude and the longitude of a place are its coordinates and the distance formula is used to find the distance between two places. The distance between two parallel lines is approximately 150 km. A family from Uttar Pradesh planned a round trip from Lucknow (L) to Puri (P) via Bhuj (B) and Nashik (N) as shown in the given figure . Answer the following questions i) Find the distance between Lucknow to Bhuj. ii) If Kota internally divides a line segment joining Lucknow to Bhuj in the ratio 3:2 then find the coordinates of Kota .  iii)a) Name the type of Triangle formed by the places Lucknow Nashik and Puri OR b) Find a point on the longitude (y-axis) which is equidistant from the points Lucknow (L) and Puri (P).	**1** **1** **2**
37.	Ashly being a plant lover decides to convert her balcony into beautiful garden full of plants. She bought few plants with pots for her balcony. She placed the pots in such a way that the number of pots in the first row is 2, second row is 5, third row is 8 and so on .Based on this information answer the questions  (i) Find the number of pots placed in the 10th row (ii) Find the difference in the number of pots placed in 5th row and 2nd row.	

	(iii) a) If Ashly wants to place 100 pots in total, then the find total no of rows formed in the arrangement. OR b) If Ashly has sufficient space for 12 rows, then how many total number of plants are placed by her with the same arrangement?	
38.	The great Stupa of Sanchi is one of the oldest stone structures in India , an important Monument of Indian Architecture. Its nucleus was a simple hemispherical brick structure built over the relics of Buddha. It is a perfect example of combination of solid figures. A big hemispherical dome with a cuboidal structure mounted on it. Based on the above information answer these questions  (i)What would be the volume of air contained in the hemispherical dome if the height of the dome is 21m ? (ii) What would be the volume of the cuboidal shaped top of dimension 8m x 6m x 4m ? (ii) a) Find the cloth material required to cover the dome if radius of base is 14 m? OR b) Find the total surface area of the combined structure of the dome?	