KENDRIYA VIDYALAYA SANGATHAN, DELHI REGION
PRE-BOARD-2023-24

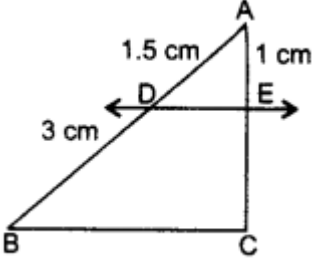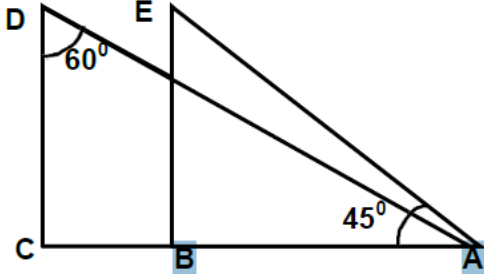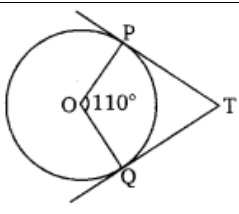**CLASS: X**   **SUBJECT: MATHEMATICS BASIC**

MM:80   **Time:3 Hours**

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General Instructions :
1. **This question paper has 5 Sections A, B, C, D and E.**
2. **Section A has 20 MCQs carrying 1 mark each.**
3. **Section B has 5 questions carrying 2 marks each.**
4. **Section C has 6 questions carrying 3 marks each.**
5. **Section D has 4 questions carrying 5 marks each.**
6. **Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.**
7. **All questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Qs of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.**
8. **Draw neat figures wherever required. Take π = $\frac{22}{7}$ wherever required if not stated.**

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	SECTION - A One mark each	
1	If the LCM of a and 18 is 36 and the HCF of a and 18 is 2, then a = ? A) 2 B) 3 C) 4 D) 1	1
2	How many zeros are there for the given polynomial? A) 0 B) 1 C) 2 D) 3	1
3	The nature of the roots of the quadratic equation $3x^2 – 2x + \frac{1}{3} = 0$ is A) Real & distinct B)Real& equal C) Not real D) None of these	1
4	A circle can have ……….. parallel tangents at the most. A) 0 B) 1 C) 2 D) Infinite	1
5	Find the 7th term of an AP whose nth term is 3n+7 A) 20 B) 28 C)24 D) 25	1
6	For what value of k : 2k, k + 10 and 3k + 2 are in AP ? A) 2 B) 4 C) 6 D) 8	1
7	In the given figure, the measure of ∠Q will be : A) 60⁰ B) 70⁰ C) 80⁰ D) None of these	1

8	In the given figure DE∥BC, Find EC.
	   A) 5 cm
	   B) 3 cm
	   C) 2 cm
	   D) 2.5 cm
		1

9	A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. What will be the volume of the solid in terms of Π. A) Π cm³ B) 2Π cm³ C) 3Π cm³ D) 4Π cm³	1
10	To locate a point Q on line segment AB such that $BQ = \frac{5}{7} \times AB$. What is the ratio of line segment in which AB is divided? A) 5:7 B) 7:5 C) 2:5 D) 5:2	1
11	In right triangle ABC, right angled at C, if tan A = 1, then the value of 2 sin A cos A is A) 1 B) 0 C) 2 D) -1	1
12	The maximum value of $\frac{1}{secA}$ is A) 0 B) 1 C) 2 d) 3	1

13	In the figure given below, what are the angles of depression from the observing positions D and E of the object A?
	
	   A)30⁰, 45⁰ B) 60⁰ , 45⁰
	   C) 45⁰, 60⁰ D) none of
	   these
		1

14	In the figure, PT and TQ are two tangents to the circle with centre O. If ∠POQ = 110⁰ , then ∠PTQ = ? A)70⁰ B) 75⁰ C) 80⁰ D) 85⁰	1
15	The length of the minute hand of a clock is 14 cm. What will be the central angle to find the area swept by the minute hand in 10 minutes. A) 15⁰ B) 30⁰ C) 45⁰ D) 60⁰	1
16	The area of the quadrant of a circle of radius 3.5 cm is : A)$\frac{11}{4}$ B)$\frac{11}{8}$ C)$\frac{77}{4}$ D) $\frac{77}{8}$	1
17	The probability of getting an even number on a single throw of a Dice is A) **2**/5 B) **3**/4 C) **1**/2 D) **1**/3	1
18	Consider the following frequency distribution: <table><tr><td>Class</td><td>0-10</td><td>10-20</td><td>20-30</td><td>30-40</td><td>40-50</td></tr><tr><td>Frequency</td><td>10</td><td>8</td><td>12</td><td>9</td><td>11</td></tr></table>the lower limit of the modal class is A) 10 B) 30 C) 40 D) 20	1
	Assertion – Reason Based Questions : In question number 19 & 20, a statement of Assertion is followed by a statement of Reason. Choose the correct option out of the following : A)Both Assertion and Reason are true and Reason is the correct explanation of Assertion. B) Both Assertion and Reason are true and Reason is not the correct explanation of Assertion. C) Assertion is true but Reason is false. D) Assertion is false but Reason is true.	

19	Assertion: When k = - 4, then linear equation: $2x + 3y = 5$, $4x + 6y = 10$ have infinitely many solutions. Reason: $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ will have infinitely many solutions if $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$	1
20	Assertion : If $(3, \frac{3}{4})$ is the mid-point of the line segment joining the points $(k,0)$ and $(7, \frac{3}{2})$, then the value of k is 0 Reason :The midpoint formula is $(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2})$	1

	SECTION - B Two marks each	
21	Solve $4x-3y = 6$, and $2x +y =8$ and hence find the value of m for which $2y = mx+ 5$.	2
22	Find the coordinates of the point which divides the line segment joining the points (4, -3) and (8, 5) in the ratio 3:1 internally?	2
23	If $5\cos \theta = 7\sin \theta$, find the value of $\frac{7 \sin \theta + 5cos\theta}{5 \sin\theta + 7cos\theta}$ OR Evaluate $2\tan^2 45^0 + \cos^2 30^0 - \sin^2 60^0$	2
24	Find the length of tangent drawn to a circle with radius 7 cm from a point 25 cm away from the centre.	2
25	Find the area of the corresponding minor sector of a circle of radius 35 cm and central angle 90°. OR A chord of a circle of radius 14cm makes a right angle at the centre. Find the length of the corresponding minor arc of the circle.	2

	SECTION - C Three marks each	
26	Show that $\sqrt{3}$ is irrational.	3
27	Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x$ and verify the relation between its zeroes and coefficients.	3
28	Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x –axis. OR If we add 1 to the numerator and subtract 1 from the denominator, a fraction reduces to 1. It becomes 1/2 if we only add 1 to the denominator. What is the fraction?	3
29	Prove that $\sec A (1 – \sin A) (\sec A + \tan A) = 1$	3
30	One card is drawn from a well shuffled deck of 52 cards. Find the probability of getting (i) A king of red colour. ii) A face Card iii)The Queen of Diamonds	3
31	Prove that the length of tangents drawn from external point to a circle are equal. OR Prove that the angle between the two tangents drawn from an external point to a circle is supplementary to the angle subtended by the lines segment joining the points of contact at the centre.	3

	SECTION - D Five marks each	
32	A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was ₹90, find the number of articles produced and the cost of each article. **OR** A pole has to be erected at a point on the boundary of a circular park of diameter 13 m in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 m. Is it possible to do so ? If yes, at what distances from the two gates should the pole be erected?	5
33	A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole ,given that $1cm^3$ of iron has approximately 8g mass. (use $\Pi = 3.14$)	5

	OR	
	From a solid cylinder whose height is 2.4 cm and diameter 1.4 cm, a conical cavity of the same height and same diameter is hollowed out. Find the total surface area of the remaining solid to the nearest cm².	
34	Find the mean and mode for the following data :	5

Classes	0-10	10-20	20-30	30-40	40-50	50-60	60-70
frequency	5	8	15	20	14	8	5
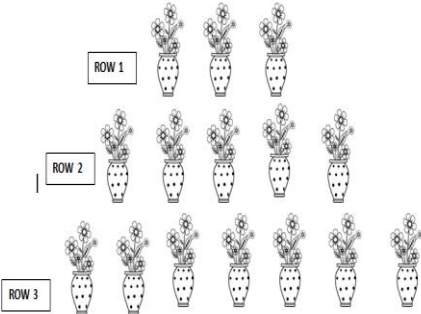
35	State and Prove the Basic Proportionality Theorem.	5

SECTION - E Four marks each

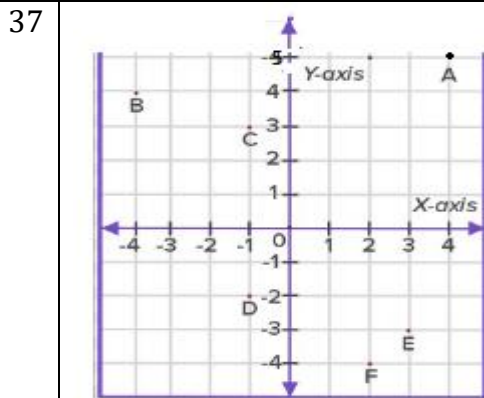| 36		Siya being a plant lover came up with an idea of opening a nursery during the lockdown and she bought a few plants with pots. She wants to place pots in such a way thatnumber of pots in row one is 3, pots in row second is 5 and in third is 7 and so on.	1+1+2

Q (i): What is the difference in number of pots increasing per row?
Q (ii): What will be the number of pots in row 5?
Q (iii): If Siya wants to place 120 pots, how many rows will it require?
               OR
 Find the difference in number of pots placed in third and eighth row.

| 37		Cartesian coordinate system is considered inside the area of a garden to understand theheights, distances and various other mathematical measurement parameters.The above positions A, B, C, D, E and F are for the plants grown in the garden. Garderner's position is at origin (0,0). He grows the plant A first, then B, C, D, E and F as according to the alphabetical manner.	1+1+2

Q (i): Where is the plant F grown?
Q (ii): How far apart are plants A and B grown ?
Q (iii): Find the coordinates of the point which divides the line segment of plant C and D in 1:1.
               OR
 Check whether the plants A, E and F collinear ?
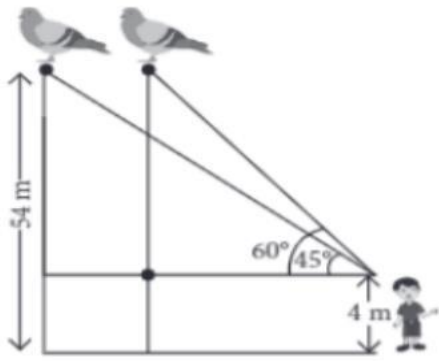
38		A boy 4 m tall spots a pigeon sitting on the top of a pole of height 54m from the ground. The angle of elevation of the pigeon from the eyes of boy at any instant is 60^0. The pigeon flies away horizontally in such a way that it remained at a constant height from the ground. After 8 seconds, the angle of elevation of the pigeon from the same point is 45^0. Based on the above information answer the following questions (take $\sqrt{3}=1.73$)	1+1+2

Q. (i) Find the distance between the boy and the pole.
Q. (ii) If the distance between the positions of pigeon increases, then what will be the effect on the angle of elevation ?

Q. (iii) Find the distance of first position of the pigeon from the eyes of the boy .
OR
How much distance the pigeon covers in 8 seconds?