KENDRIYA VIDYALAYA SANGATHAN CHENNAI REGION

PREBOARD - I EXAMINATION 2024 - 25

CLASS X MATHEMATICS BASIC (241)

Time Allowed : 3 hrs **Maximum Marks : 80**

General Instructions:

1. This Question Paper has 5 Sections A - E.

2. Section A has 20 MCQs carrying 1 mark each.

3. Section B has 5 questions carrying 02 marks each.

4. Section C has 6 questions carrying 03 marks each.

5. Section D has 4 questions carrying 05 marks each.

6. Section E has 3 case based integrated units of assessment (04 marks each) with subparts of the values of 1, 1 and 2 marks each respectively.

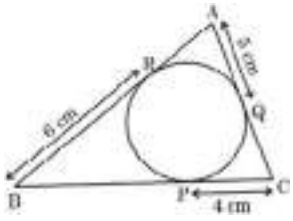
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E 8. Draw neat figures wherever required.

8.Take π =22/7 wherever required if not stated

	Section A	
1	The zeroes of the quadratic polynomial $2x^2$ - 3x - 9 are: a) $-3, \frac{-3}{2}$ b) $3, \frac{3}{2}$ c) $3, \frac{-3}{2}$ d) $-3, \frac{3}{2}$	**[1]**
2	For what value of k, the product of zeroes of the polynomial kx^2 - 4x - 7 is 2?	**[1]**

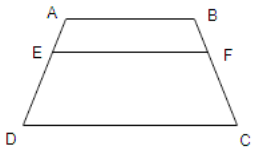
	a) $\frac{7}{2}$ b) $-\frac{2}{7}$ c) $-\frac{1}{14}$ d) $-\frac{7}{2}$	
3	The pair of linear equations 4x + 6y = 9 and 2x + 3y = 6 has a) no solution b) two solutions c) one solution d) many solutions	**[1]**
4	$2x^2$ - 3x + 2 = 0 have a) Real and Distinct roots b) Real and Equal roots c) Real roots d) No Real roots	**[1]**
5	Which term of the A.P. - 29, - 26, - 23, ..., 61 is 16? a) 11^{th} b) 31^{st} c) 10^{th} d) 16^{th}	**[1]**
6	If (3, –6) is the mid - point of the line segment joining (0, 0) and (x, y), then the point (x, y) is: a) (6, - 6) b) (6, - 12)	**[1]**

	c) $\left(\frac{3}{2}, -3\right)$ d) (- 3, 6)	
7	Distance of point P(3, 4) from x - axis is a) 5 units b) 1 unit c) 4 units d) 3 units	**[1]**
8	If sin A =$\frac{1}{2}$, then the value of cot A is a) $\sqrt{3}$ b) $\frac{\sqrt{3}}{2}$ c) $\frac{1}{\sqrt{3}}$ d) 1	**[1]**
9	The value of sin 45°+ cos 45°is a) $\sqrt{2}$ b) $\frac{1}{\sqrt{2}}$ c) 1 d) $\frac{1}{\sqrt{3}}$	**[1]**
10	The length of the tangent drawn from a point 8 cm away from the centre of a circle of radius 6 cm is a) 5 cm b) $\sqrt{7}$ cm c) 10 cm	**[1]**

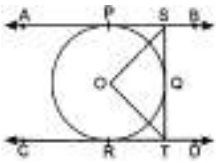
	d) $2\sqrt{7}$ cm	
11	In the given figure, the perimeter ofΔ ABC is:  a) 15 cm b) 30 cm c) 60 cm d) 45 cm	**[1]**
12	A circle is of radius 3 cm. The distance between two of its parallel tangents is: a) 3 cm b) 4.5 cm c) 6 cm d) 12 cm	**[1]**
13	A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1cm and the height of the cone is equal to its radius. The volume of the solid is a) πcm^3 b) $4\pi cm^3$ c) $2\pi cm^3$ d) $3\pi cm^3$	**[1]**
14	How many bricks each measuring (25 cm$\times$ 11.25 cm $\times$ 6 cm) will be required to construct a wall (8 m $\times$ 6 m $\times$ 22.5 cm)? a) 7200	**[1]**

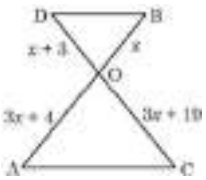
	b) 4800 c) 8000 d) 6400	
15	The mean of all the factors of 24 is a) 7.5 b) 7 c) 6.5 d) 24	**[1]**
16	For a frequency distribution, mean, median and mode are connected by the relation a) Mode = 3 Median - 2 Mean b) Mode = 2 Median - 3 Mean c) Mode = 3 Mean - 2 Median d) Mode = 3 Median + 2 Mean	**[1]**
17	Which of the following cannot be the probability of occurrence of an event? a) 0.2 b) 1.6 c) 0.8 d) 0.4	**[1]**
18	An unbiased die is thrown once. The probability of getting a composite number is a) $\frac{2}{5}$ b) $\frac{1}{3}$	**[1]**

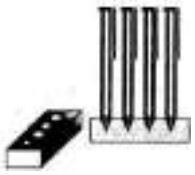
	c) $\frac{2}{3}$ d) $\frac{1}{2}$	
19	**Assertion (A):** The HCF of two numbers is 5 and their product is 150, then their LCM is 30. **Reason (R):** For any two positive integers a and b, HCF (a, b) + LCM (a, b) = a × b. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is true but R is false. d) A is false but R is true.	**[1]**
20	**Assertion (A):** Area of a sector of a circle of radius r and central angle $\theta = \left(\frac{\theta}{180} \times 2\pi r\right)$ **Reason (R):** Sector is a part of a circle enclosed between two bounding radii and a corresponding arc. a) Both A and R are true and R is the correct explanation of A. b) Both A and R are true but R is not the correct explanation of A. c) A is false but R is true. d) A is true but R is false.	**[1]**
	Section B	
21	Find the HCF of 96 and 404 by prime factorisation method. Hence, find their LCM. **OR** Find the LCM and HCF of the integers 12, 15 and 21 by applying the prime factorisation method.	**[2]**
22	Find the value of y for which the distance between the points P (2, - 3) and Q(10, y) is 10 units.	**[2]**

23	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]**
24	If cos A =$\frac{5}{13}$,then verify that $\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cot A}$ = cos A + sin A.	**[2]**
25	Gopi buys a fish from a shop for his aquarium. The shopkeeper takes out one fish at random from a tank containing 5 male fish and 8 female fish. What is the probability that the fish taken out is a male fish?  **(OR)** A bag contains 2 green, 3 red and 4 black balls. A ball is taken out from the bag at random. Find the probability that the selected ball is a) Not Green b) Not Black	**[2]**
	Section C	
26	Prove that$\sqrt{2}$ is an irrational number.	**[3]**
27	Find a quadratic polynomial, the sum and product of whose zeroes are$\sqrt{2}$ and $\frac{1}{3}$, respectively.	**[3]**
28	Is it possible to design a rectangular park of perimeter 80 m and area 400 m^2 ? If so, find its length and breadth.	**[3]**
29	Write all the other trigonometric ratios of∠ A in terms of sec A.	**[3]**
30	ABCD is a trapezium with AB || DC. E and F are two points on non - parallel sides AD and BC respectively, such that EF is parallel to AB. Show that$\frac{AE}{ED} = \frac{BF}{FC}$  **OR**	**[3]**

	E is a point on side AD produced of a parallelogram ABCD and BE intersects CD at F. Prove that$\Delta ABE \sim \Delta CFB$.	
31	In a circle of radius 21 cm, an arc subtends an angle of 60^o at the center. Find: 1. the length of the arc. 2. area of the sector formed by the arc. 3. area of the segment formed by the corresponding chord **OR** A brooch is made with silver wire in the form of a circle with diameter 35 mm. The wire is also used in making 5 diameters which divide the circle into 10 equal sectors as shown in figure. Find: 1. the total length of the silver wire required. 2. the area of each sector of the brooch. 	**[3]**
	Section D	
32	Half the perimeter of a rectangular garden, whose length is 4 m more than its width, is 36 m. Find the dimensions of the garden graphically. **OR** 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?	**[5]**
33	A statue, 1.6 m tall, stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60^o and from the same point the angle of elevation of the top of the pedestal is 45^o. Find the height of the pedestal.	**[5]**

34	In figure AB and CD are two parallel tangents to a circle with centre O. ST is tangent segment between the two parallel tangents touching the circle at Q. Show that$\angle$ SOT = 90 ^{o}  	**[5]**
35	The following table shows the ages of the patients admitted in a hospital during a year: <table><tr><td>**Age (in years)**</td><td>5-15</td><td>15-25</td><td>25-35</td><td>35-45</td><td>45-55</td><td>55-65</td></tr><tr><td>**Number of patients**</td><td>6</td><td>11</td><td>21</td><td>23</td><td>14</td><td>5</td></tr></table> Find the mode and the mean of the data given above. Compare and interpret the two measures of central tendency. **OR** The following table gives the distribution of the life time of 400 neon lamps: <table><tr><th>Lite time (in hours)</th><th>Number of lamps</th></tr><tr><td>1500-2000</td><td>14</td></tr><tr><td>2000-2500</td><td>56</td></tr><tr><td>2500-3000</td><td>60</td></tr><tr><td>3000-3500</td><td>86</td></tr><tr><td>3500-4000</td><td>74</td></tr><tr><td>4000-4500</td><td>62</td></tr><tr><td>4500-5000</td><td>48</td></tr></table> Find the median life time of a lamp.	**[5]**
	Section E	
36	**Read the following text carefully and answer the questions that follow:** Akshat's father is planning some construction work in his terrace area. He ordered 360 bricks and instructed the supplier to keep the bricks in such as way that the bottom row has 30 bricks and next is one less than that and so on.	**[4]**

	 The supplier stacked these 360 bricks in the following manner, 30 bricks in the bottom row, 29 bricks in the next row, 28 bricks in the row next to it, and so on. 1. In how many rows, 360 bricks are placed? (1) 2. How many bricks are there in the top row? (1) 3. How many bricks are there in 10^{th} row? (2) **OR** If which row 26 bricks are there? (2)	
37	**Read the following text carefully and answer the questions that follow:** In the figure given below, a folding table is shown:   The legs of the table are represented by line segments AB and CD intersecting at O. Join AC and BD. Considering table top is parallel to the ground, and OB = x, OD = x + 3, OC = 3x + 19 and OA = 3x + 4, answer the following questions: 1. Prove that∆ OAC is similar to ∆ OBD. 2. Prove that$\frac{\mathrm{OA}}{\mathrm{AC}} = \frac{\mathrm{OB}}{\mathrm{BD}}$ 3.	**[4]**

	a. Observe the figure and find the value of x. Hence, find the length of OC. **OR** b. Observe the figure and find $\frac{BD}{AC}$.	
38	**Read the following text carefully and answer the questions that follow:** A carpenter in the small town of Bareilly used to make and sell different kinds of wood items like a rectangular box, cylindrical pen stand, and cuboidal pen stand. One day a student came to his shop and asked him to make a pen stand with the dimensions as follows: A pen stand should be in the shape of a cuboid with four conical depressions to hold pens. The dimensions of the cuboid should be 15 cm by 10 cm by 3.5 cm. The radius of each of the depressions is0.5 cm and the depth is1.4 cm.  1. The volume of the cuboidal part. (1) 2. The volume of wood in the entire stand. (1) 3. Total volume of conical depression. (2) **OR** If the cost of wood used is ₹ 10 per cm^3 , then the total cost of making the pen stand. (2)	**[4]**