KENDRIYA VIDYALAYASANGATHAN ,BHUBANESWAR REGION SET-2

PRE-BOARD EXAMINATION (2025-26)

CLASS :X

SUBJECT: MATHEMATICS (041)

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

General Instructions :

Read the following instructions very carefully and strictly follow them :

(i) This question paper contains 19 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. 1-18are Multiple Choice Questions (MCQs) and questions no.19 and 20 are Assertion- Reason based questions of 1 mark each.

(iv) In Section B, Questions no. 21-25 are Very Short Answer(VSA)type questions, carrying 2 marks each.

(v) In Section C, Questions no.26 -31 are Short Answer (SA) type questions, carrying 3 marks each.

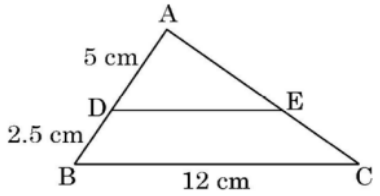
(vi) In Section D, Questions no.32 - 35 are Long Answer (LA) type questions carrying 5 marks each.

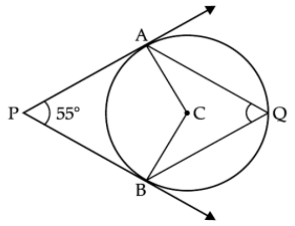
(vii) In Section E, Questions no. 36-38 are case study based questions carrying4 marks each with sub parts of the values of 1, 1 and 2 marks each respectively.

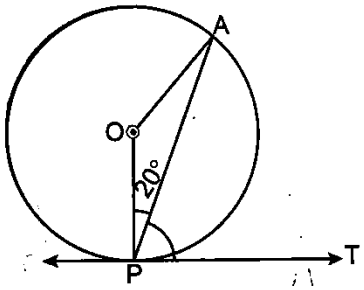
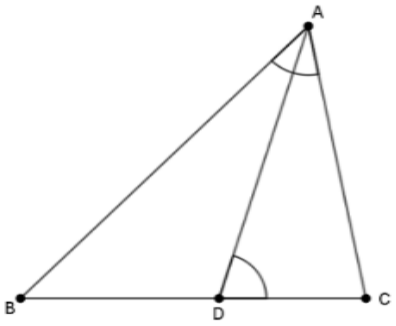
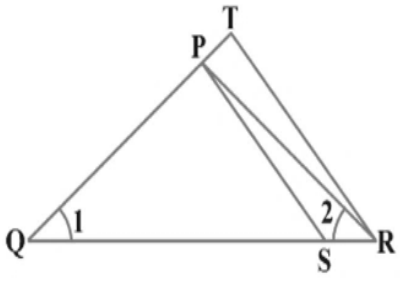
(viii) There is no overall choice. However, an internal choice in 2 questions of Section B, 2 questions of Section C and 2 questions of Section D has been provided. An internal choice has been provided in all the 2 marks questions of Section E.

(ix) Draw neat figures wherever required. Take π =22/7 wherever required if not stated .

SECTION A(Section A has 20 MCQ type questions carrying 01 marks each)

1	The common difference of an A.P. in which $a_{15} - a_{11} = 48$, is (a) –12 (b) 16 (c) 12 (d) –16	1
2	If p and q are the zeroes of the quadratic polynomial $f(x) = 2x^2 - 7x + 3$, find the value of p + q – pq is(a) 1 (b) 2 (c) 3 (d) None of these	1
3	If the HCF (2520, 6600) = 40 and LCM (2520, 6600) = 252 × k, then the value of k is (a) 1650 (b) 1600 (c) 165 (d) 1625	1
4	In the given figure ∆ABC is shown. DE is parallel to BC. If AD = 5 cm, DB = 2.5 cm and BC = 12 cm, then DE is equal to (a) 10 cm (b) 6 cm (c) 8 cm (d) 7.5 cm 	1
5	The graph of equations x + 2y – 4 = 0 and 2x + 4y – 12 = 0 represents: (a) intersecting lines (b) parallel lines (c) coincident lines (d) none	1
6	Which of the following is not a quadratic equation (a) $x^2 + 3x - 5 = 0$ (b) $x^2 + x^3 + 2 = 0$ (c) 3 + x + $x^2 = 0$ (d) $x^2 - 9 = 0$	1
7	The ratio in which x-axis divides the join of (2, -3) and (5, 6) is: (a) 1: 2 (b) 3 : 4 (c) 1: 3 (d) 1: 5	1
8	If one root of equation $4x^2 - 2x + k - 4 = 0$ is reciprocal of the other. The value of k is: (a) -8 (b) 8 (c) -4 (d) 4	1
9	The value of k for which the system of equations 3x – y + 8 = 0 and 6x – ky + 10 = 0 has infinitely many solutions: (a) –2 (b) 1/2 (c) 2 (d) −1/2	1

<table>
<tr><td>10</td><td>In the given figure, PA and PB are tangents from external point P to a circle with centre C and Q is any point on the circle. Then the measure of ∠AQB is (a) 62½° (b) 125° (c) 55° (d) 90°

</td><td>1</td></tr>
<tr><td>11</td><td>If θ is an acute angle of a right-angled triangle, then which of the following equation is not true?
(a) sinθ. cotθ = cosθ (b) cosθ. tanθ = sinθ (c) cosec²θ – cot²θ = 1 (d) tan²θ – sec²θ = 1</td><td>1</td></tr>
<tr><td>12</td><td>When the shadow of a pole h metres high is √3h metres long, the angle of elevation of the Sun is
(a) 45°(b) 60° (c) 30° (d) 15°</td><td>1</td></tr>
<tr><td>13</td><td>If the radius of a sphere is doubled, then the ratio of the original and new surface areas is
(a) 1 : 2 (b) 2 : 1 (c) 1 : 4 (d) 4 : 1</td><td>1</td></tr>
<tr><td>14</td><td>If the circumference of a circle and the perimeter of a square are equal, then (a) Area of the circle = Area of the square (b) Area of the circle > Area of the square (c) Area of the circle < Area of the square (d) Nothing definite can be said about the relation between the areas of the circle and square.</td><td>1</td></tr>
<tr><td>15</td><td>The runs scored by a batsman in 35 different matches are given below:
<table>
<tr><td>Runs Scored</td><td>0-15</td><td>15-30</td><td>30-45</td><td>45-60</td><td>60-75</td><td>75-90</td></tr>
<tr><td>Frequency</td><td>5</td><td>7</td><td>4</td><td>8</td><td>8</td><td>3</td></tr>
</table>
The lower limit of the median class is (a) 15 (b) 30 (c) 45 (d) 60</td><td>1</td></tr>
<tr><td>16</td><td>The relation between mean, mode and median is (a) mode = (3 x mean) - (2 x median)
(b) mode = (3 x median) - (2 x mean) (c) mean = (3 x median) - (2 x mode)
(d) median = (3 x mean) - (2 x mode)</td><td>1</td></tr>
<tr><td>17</td><td>If P(E) = 0.07, then what is the probability of ‘P(not E) ?(a) 0.93 (b) 0.95 (c) 0.89 (d) 0.90</td><td>1</td></tr>
<tr><td>18</td><td>Abag has 5 white marbles, 8 red marbles and 4 purple marbles. If we take a marble randomly, then what is the probability of not getting purple marble? (a) 0.5 (b) 0.66 (c) 0.08 (d) 0.77</td><td>1</td></tr>
<tr><td colspan="3">In the following questions no 19 and 20, a statement of assertion is followed by a statement of reason. Mark the correct choice as:
(a)Both assertion and reason are true and reason is the correct explanation of assertion.
(b)Both assertion and reason are true but reason is not the correct explanation of assertion.
(c)Assertion is true but reason is false.
(d)Assertion is false but reason is true.</td></tr>
<tr><td>19</td><td>Assertion(A):A horse is tied to a peg at one corner of a square shaped grass field of side 15 m by means of a 7 m long rope.The area of that part of the field in which the horse can graze is 77/ 2 sq.m.
Reason(R):Area of the quadrant = $\frac{90^0}{360^0}$x π r²</td><td>1</td></tr>
<tr><td>20</td><td>Assertion(A):sin(A + B) = sin A + sin B.
Reason(R):For any angle θ, 1 + tan²θ = sec²θ.</td><td>1</td></tr>
<tr><td colspan="3">SECTION B (Section B has 05 questions carrying 02 marks each)</td></tr>
<tr><td>21</td><td>Show that 6^n cannot end with digit 0 for any natural number 'n' .</td><td>2</td></tr>
</table>

22	Find the zeroes of the polynomial $4s^2 - 4s + 1$ and verify the relationship between the zeroes and the coefficients. .	2
23	Find the point P on x-axis equidistant from the points A(-1,0) and B(5,0) OR Find the type of triangle ABC formed whose vertices are A(1, 0), B(–5, 0) and C(–2, 5).	2
24	PT is tangent to the circle with centre at O and < OPA = 20^0. Find <APT OR From an external point P, tangents PA and PB are drawn to a circle with center O. If CD is the tangent to the circle at a point E and PA = 14cm, find the perimeter of ΔPCD.  	2
25	A card is drawn at random from a well shuffled pack of 52 cards. Find the probability of getting (i) a red king (ii) a queen or a jack	2
	SECTION C (Section C has 06 questions carrying 03 marks each)	
26	Prove that √5 is an irrational number.	3
27	Solve the following linear equations: 152x – 378y = –74 and –378x + 152y = –604	3
28	D is a point on the side BC of a triangle ABC such that $\angle ADC = \angle BAC$, prove that $CA^2 = CB.CD$  OR In the figure $\frac{QR}{QS} = \frac{QT}{PR}$ and <1= <2. Show that ΔPQS ~ ΔTQR .  	3
29	Prove that the length of tangents drawn from an external point to a circle are equal.	3
30	Find the coordinates of the points which divide the line segment joining A (–2, 2) and B (2, 8) into four equal parts.	3

<table>
<tr><td>31</td><td>A chord is subtending an angle of 90° at the centre of a circle of radius 14 cm. Find the area of the corresponding minor segment of the circle.

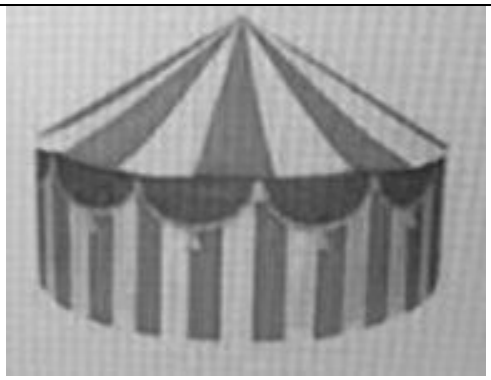
OR

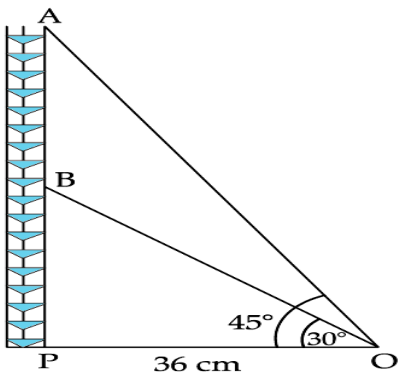
A chord of a circle of radius 15 cm subtends an angle of 60^0 at the centre. Find the area of the corresponding minor sector and major sector of the circle. (Take $\pi = 3.14$, $\sqrt{3} = 1.732$)</td><td>3</td></tr>
<tr><td colspan="3">SECTION D (Section D has 04 questions carrying 05 marks each).</td></tr>
<tr><td>32</td><td>Prove that $(\sin A + \text{cosec } A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A$</td><td>5</td></tr>
<tr><td>33</td><td>An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bangalore (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 11 km/h more than that of the passenger train, find the average speed of the two trains.

OR

Sum of the areas of two squares is 468 m^2. If the difference between their perimeters is 24 m, find the sides of the two squares.</td><td>5</td></tr>
<tr><td>34</td><td>Prove that if a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio.
Using the above theorem prove that a line through the point of intersection of the diagonals and parallel to the base of the trapezium divides the non parallel sides in the same ratio.</td><td>5</td></tr>
<tr><td>35</td><td>The government rescued 100 people after a train accident. Their ages were recorded in the following table. Find their mean age.(use Assume mean method)
<table>
<tr><th>Age (in years)</th><th>Number of people rescued</th></tr>
<tr><td>10 – 20</td><td>9</td></tr>
<tr><td>20 – 30</td><td>14</td></tr>
<tr><td>30 – 40</td><td>15</td></tr>
<tr><td>40 – 50</td><td>21</td></tr>
<tr><td>50 – 60</td><td>23</td></tr>
<tr><td>60 – 70</td><td>12</td></tr>
<tr><td>70 – 80</td><td>6</td></tr>
</table>
OR

The median of the following data is 868. Find the values of x and y, if the total frequency is 100.
<table>
<tr><th>Class</th><th>Frequency</th></tr>
<tr><td>800 – 820</td><td>7</td></tr>
<tr><td>820 – 840</td><td>14</td></tr>
<tr><td>840 – 860</td><td>x</td></tr>
<tr><td>860 – 880</td><td>25</td></tr>
<tr><td>880 – 900</td><td>y</td></tr>
<tr><td>900 – 920</td><td>10</td></tr>
<tr><td>920 – 940</td><td>5</td></tr>
</table></td><td>5</td></tr>
</table>

	SECTION E	
36	The word '**circus**' has the same root as '**circle**'. In a closed circular area, various entertainment acts including human skill and animal training are presented before the crowd. A circus tent is cylindrical up to a height of 8 m and conical above it. The diameter of the base is 28 m and the total height of the tent is 18.5 m. Based on the above, answer the following questions: (i)Find the slant height of the conical part. (ii) Determine the floor area of the tent. (iii)(a) Find the area of the cloth used for making the tent. (OR) (b) Find the total volume of air inside an empty tent. 	1 1 2
37	A school has decided to plant some endangered trees on 51st World Environment Day in the nearest park. They have decided to plant those trees in few concentric circular rows such that each succeeding row has 20 more trees than the previous one. The first circular row has 50 trees. Based on the above given information, answer the following questions : (i) How many trees will be planted in the 10^{th} row ? (ii) How many more trees will be planted in the 8^{th} row than in the 5^{th} row ? (iii) (a) If 3200 trees are to be planted in the park, then how many rows are required ? **OR** (b) If 3200 trees are to be planted in the park, then how many trees are still left to be planted after the 11^{th} row ? 	1 1 2

38	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. 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 cm. From point O, the angle of elevation of the top of the Section B is 30° and the angle of elevation of the top of Section A is 45°.  Based on the above information, answer the following questions: (Take $\sqrt{3} = 1.732$) (i) Find the length of the wire from the point O to the top of section B. (ii) Find the distance AB. **OR** Find the area of ΔOPB. (iii) Find the height of the Section A from the base of the tower.	1 2 1

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