

Pre-Board Examination
Mathematics – Standard (041)
Class-X, Session: 2021-22

TERM II

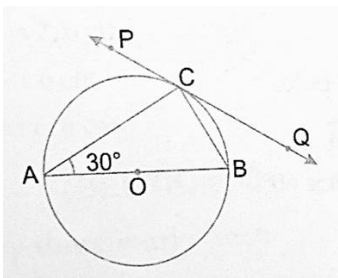
SET 2

Time Allowed: 2 hours

Max. Marks: 40

General Instructions:

1. The question paper consists of 14 questions divided into three sections A, B and C.
2. All questions are compulsory.
3. Section A comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
4. Section B comprises of 4 questions of 3 marks each. Internal choice has been provided in one question.
5. Section C comprises of 4 questions of 4 marks each. Internal choice has been provided in one question. It contains two case study questions.

SECTION A																		
Q No						Marks												
1	Is – 150 a term of the AP 17, 12, 7, 2...? OR If the 9 th term of an A.P. is zero, then show that its 29 th term is double of its 19 th term.					2												
2	In the following figure, PQ is a tangent at a point C to a circle with centre O. If AB is a diameter and $\angle CAB = 30^\circ$ find $\angle PCA$.					2												
																		
3	Calculate the mode of the following distribution:					2												
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 15%;">Class</th> <th style="width: 15%;">10 - 15</th> <th style="width: 15%;">15 - 20</th> <th style="width: 15%;">20 - 25</th> <th style="width: 15%;">25 - 30</th> <th style="width: 15%;">30 - 35</th> </tr> </thead> <tbody> <tr> <td>Frequency</td> <td style="text-align: center;">4</td> <td style="text-align: center;">7</td> <td style="text-align: center;">20</td> <td style="text-align: center;">8</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>							Class	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	Frequency	4	7	20	8	1
Class	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35													
Frequency	4	7	20	8	1													
4	Find the value of k for which the equation $x^2 + k(2x + k - 1) = 0$ has real and equal roots.					2												



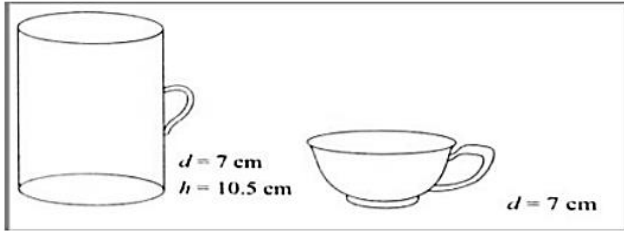
5	The dimensions of a metallic cuboid are $100\text{ cm} \times 80\text{ cm} \times 64\text{ cm}$. It is melted and recast into a cube. Find the surface area of the cube.	2
6	Solve for x : $x^2 - 2ax - (4b^2 - a^2) = 0$. OR Had Meena scored 10 more marks in her Mathematics test out of 30 marks, 9 times these marks could have been the square of her actual marks. How many marks did she get in the test?	2

SECTION B

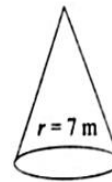
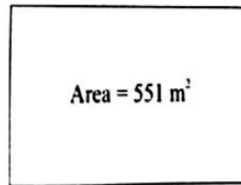
Q No		Marks																
7	<p>The arithmetic mean of the following frequency distribution is 50. Find the value of p.</p> <table border="1"> <tr> <td><i>Class</i></td> <td>0 - 20</td> <td>20 - 40</td> <td>40 - 60</td> <td>60 - 80</td> <td>80 - 100</td> </tr> <tr> <td><i>Frequency</i></td> <td>17</td> <td>p</td> <td>32</td> <td>24</td> <td>19</td> </tr> </table>	<i>Class</i>	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100	<i>Frequency</i>	17	p	32	24	19	3				
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8	<p>From a point on the ground, the angles of elevation of the bottom and the top of a transmission tower fixed at the top of a 20 m high building are 45° and 60° respectively. Find the height of the tower. [Use $\sqrt{3} = 1.732$] OR An observer 1.5 m tall is 20.5 m away from a tower 22 m high. Determine the angle of elevation of the top of the tower from the eye of the observer.</p>	3																
9	Draw a circle of radius 4 cm. Construct a pair of tangents to it, the angle between which is 60° . Measure the distance between the centre of the circle and the point of intersection of the tangents.	3																
10	<p>The percentage of marks obtained by 100 students in an examination are given below:</p> <table border="1"> <tr> <td><i>% marks obtained</i></td> <td>30-35</td> <td>35-40</td> <td>40-45</td> <td>45-50</td> <td>50-55</td> <td>55-60</td> <td>60-65</td> </tr> <tr> <td><i>No. of students</i></td> <td>14</td> <td>16</td> <td>18</td> <td>23</td> <td>18</td> <td>8</td> <td>3</td> </tr> </table> <p>Determine the median percentage of marks.</p>	<i>% marks obtained</i>	30-35	35-40	40-45	45-50	50-55	55-60	60-65	<i>No. of students</i>	14	16	18	23	18	8	3	3
<i>% marks obtained</i>	30-35	35-40	40-45	45-50	50-55	55-60	60-65											
<i>No. of students</i>	14	16	18	23	18	8	3											

SECTION C

Q No		Marks
11	If the sum of first 4 terms of an AP is 40 and that of first 14 terms is 280. Find the sum of its first n terms.	4
12	<p>In the following figure, XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B. Prove that $\angle AOB = 90^\circ$.</p>	4

	<p style="text-align: center;">OR</p> <p>PQ is a chord of length 8 cm of a circle of radius 5 cm. The tangents at P and Q intersect at an external point T. Find the length of PT.</p>	
<p style="text-align: center;">13</p>	<p style="text-align: center;">Case Study 1</p> <p>Air Traffic Control (ATC) is a service provided by ground-based air traffic controllers who direct aircraft on the ground and can provide advisory services to aircraft in non-controlled air space.</p>  <p>ATC finds that the angle of elevation of an aeroplane from a point on the ground is 60° and after a flight of 30 seconds he finds that the angle of elevation becomes 30°. Given that the aeroplane is flying at a constant height of $3000\sqrt{3}$ m;</p> <ol style="list-style-type: none"> i) Make a labelled figure on the basis of the given information and calculate the distance travelled by the aeroplane in 30 seconds. ii) Find the speed of the aeroplane in km/h. 	<p style="text-align: center;">2 2</p>
<p style="text-align: center;">14</p>	<p style="text-align: center;">Case Study 2</p> <p>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 an adventure at Sakleshpur. At the camp, the waiter served some students with a welcome drink in a cylindrical glass and some students in a hemispherical cup whose dimensions are shown below.</p>   <p>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</p>	

was given a canvas of area 551 m^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 1 m^2 , the students put the tents. The radius of the tent is 7 m .



- i) Find the volume of cylindrical cup and the hemispherical cup. Which container has more juice?
- ii) Find the height of the conical tent prepared to accommodate four students.

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