

KENDRIYA VIDYALAYA SANGATHAN, DELHI REGION

PRE BOARD

1 (2025-26)

CLASS: X
MM:80SUBJECT: MATHEMATICS STANDARD
Time:3:00 Hours

9

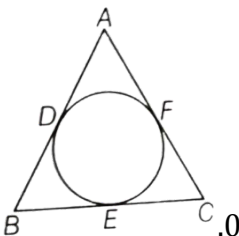
General Instructions:

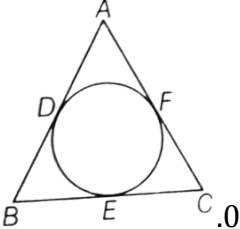
1. This Question Paper has 5 Sections A, B, C, D and E.
2. Section A has 18 MCQs And 2 Assertion and reasoning Questions carrying 1 mark each.
3. Section B has 5 questions carrying 02 marks each.
4. Section C has 6 questions carrying 03 marks each.
5. Section D has 4 questions carrying 05 marks each.
6. Section E has 3 case based integrated units of assessment (04 marks each) with sub- parts of the values of 1, 1 and 2 marks each respectively.
7. All Questions are compulsory. However, an internal choice in 2 Questions of 5 marks, 2 Questions of 3 marks and 2 Questions of 2 marks has been provided. been provided in the 2 marks questions of Section E
8. Draw neat figures wherever required. Take $\pi = 22/7$ wherever required if not stated.

SECTION A

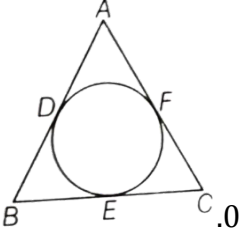
Section A consists of 20 questions of 1mark each.

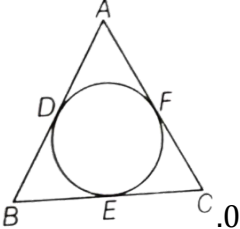
Q.1	If $p = 2^3 \times 5$, $q = 2 \times 3 \times 5$, $r = 2^n \times 3 \times 5^2$ and $\text{LCM}(p,q,r) = 2^5 \times 3 \times 5^2$ then $n =$ (a) 1 (b) 5 (c) 3 (d) 2	1
Q.2	If α and β are the zeroes of a quadratic polynomial $x^2 - 6x + k$ and $3\alpha + 2\beta = 20$ then the value of k is (a) 8 (b) -8 (c) 16 (d) -16	1
Q.3	Lines $3x - 2y + 4 = 0$ and $6x - 4y + 6 = 0$ are a) intersect each other (b) are parallel to each other (c) coincide with each other (d) are perpendicular to each other	1
Q.4	If the discriminant of the quadratic equation $3x^2 - 2x + c = 0$ is 16, then the value of c is a) 1 (b) 0 (c) -1 (d) 3	1

Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
Q.24	<p>ABC is an isosceles triangle with $AB=AC$ circumscribed about a circle. Prove that BC is bisected at E.</p> <div style="text-align: center;">  </div>	2												
Q.25	<p>If the mean of the following distribution is 54 then find the value of P</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Class</td> <td>0-20</td> <td>20-40</td> <td>40-60</td> <td>60-80</td> <td>80-100</td> </tr> <tr> <td>Frequency</td> <td>7</td> <td>P</td> <td>10</td> <td>9</td> <td>13</td> </tr> </table>	Class	0-20	20-40	40-60	60-80	80-100	Frequency	7	P	10	9	13	2
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Section C consists of 6 questions of 3 marks each														
Q.26		3												
Q.27		3												
Q.28		3												
Q.29	<p>Prove that $\tan(1 - \cot \theta) + (1 -) = 1 + \sec \theta \cdot \operatorname{cosec} \theta$</p>	3												
Q.5	<p>Value(s) of k for which the quadratic equation $2x^2 - kx + k = 0$ has equal roots is</p>	1												

Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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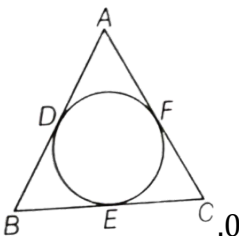
a) 0 only (b) 4 (c) 8 onl (d) 0, 8

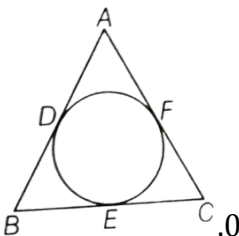
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Q.6	<p>The value of x, for which $2x, x+10, 3x+2$ are three consecutive terms of an AP.</p>	1												

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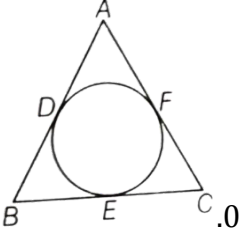
Q.7 In the figure, if $MN \parallel QR$, $PM = 6\text{cm}$, $QM = 8\text{cm}$ and $QR = 28\text{cm}$, then MN is equal to

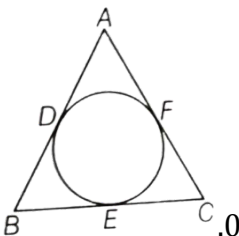
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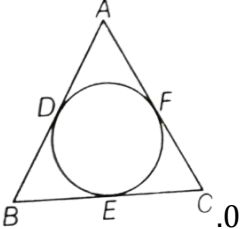
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(a) 20 cm

(b) 32 cm

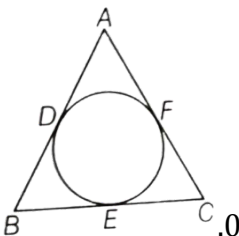
(c) 12cm

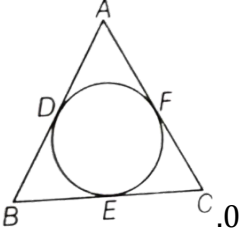
(d) 16 cm

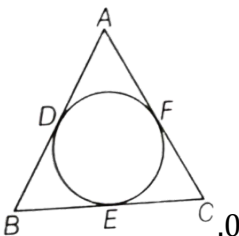
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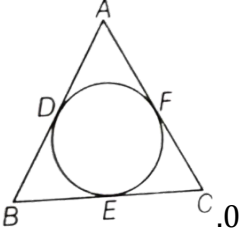
Q.8 What is the ratio in which the line segment joining (2, -3) and (5,6) is divided by x-axis?

1

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Q.9	<p>If A(6,1), B(8,2), C(9,4), D(X,3) are the vertices of a parallelogram ABCD, then the value of x is</p>	1												

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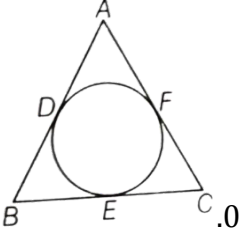
Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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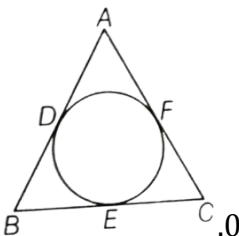
(a) 4

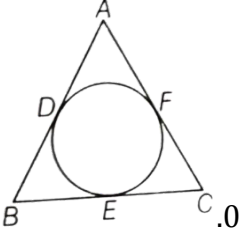
(b) 7

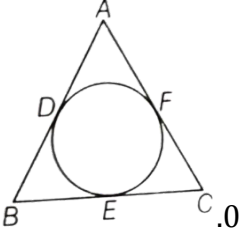
(c) 6

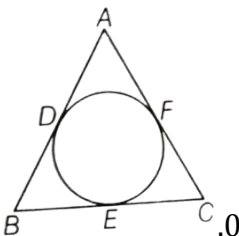
(d) 5

Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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Q.29	<p>Prove that $\tan(1 - \cot \theta) + (1 -) = 1 + \sec \theta \cdot \operatorname{cosec} \theta$</p>	3												
Q.10	<p>If $\sec \theta + \tan \theta = X$ then $\sec \theta - \tan \theta =$</p>	1												

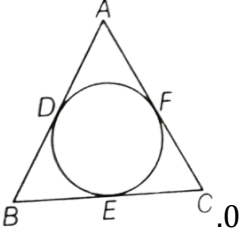
Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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Q.11	<p>In the given figure, PQ is a tangent at point R of a circle with centre O and $\angle QRB = 30^\circ$, then $\angle RBA$ is equal to</p>	1												

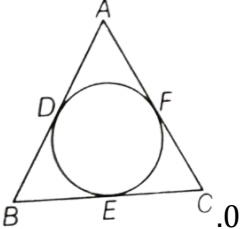
Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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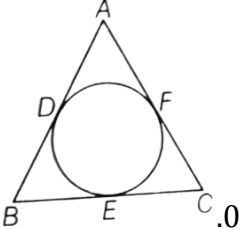


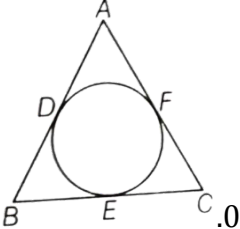
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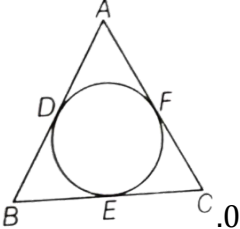
(a) 30° (b) 90° (c) 120° (d) 60°

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Q.12	<p>If an arc subtends an angle of 90° at the centre of a circle, then the ratio of its length to circumference of the circle is</p>	1
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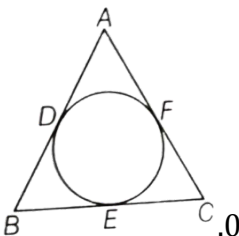
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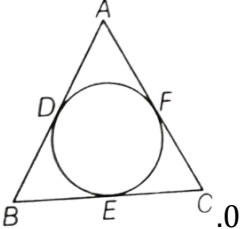
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Q.13	Which of the following is true?	1												

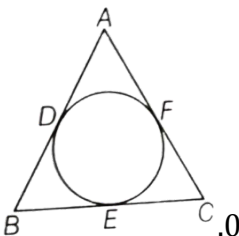
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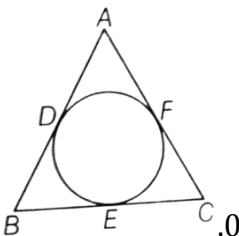
(a) Mode = 2 Median - Mean
(c) 3 Median = 2 Mean + Mode

(b) Mode = 3 Median + 2 Mean
(d) None of these

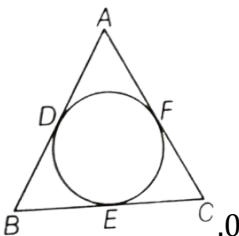
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Q.14	<p>A cylinder, a cone and a hemisphere are of equal base and have the same height. Ratio of their volumes is</p>	1												

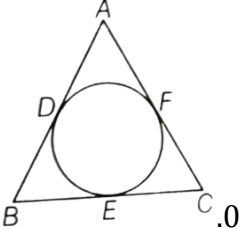
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<p>(a) 3:1:2 (b) 2:3:1 (c) 1:2:3 (d) 3:1:1</p>														

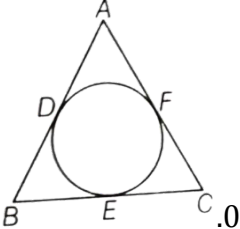
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Q.15	<p>If $\tan 3x = 1$ then the value of $\operatorname{cosec} 2x$ is</p>	1												

Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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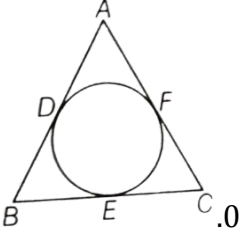
- (a) 1 (b) $\sqrt{2}$ (c) 2 (d) 0

Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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Q.16	<p>A letter is chosen at random from the letters of the word MATHEMATICS then</p>	1												

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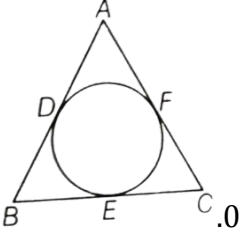
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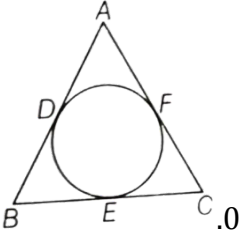
(a) 6

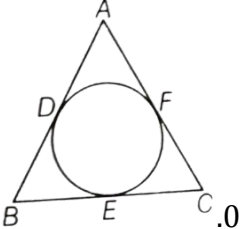
(b) 5

(c) 4

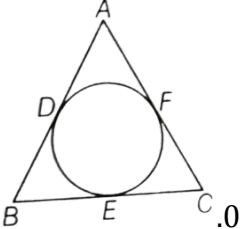
(d) 7

Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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Q.17	<p>The value of Y for which the class mark of the class interval 30 -Y is 36 is</p> <p>(a) 38 (b) 40 (c) 36 (d) 42</p>	1												

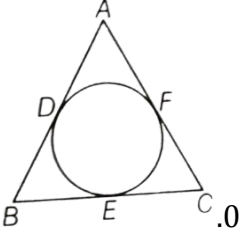
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Q.18	<p>2 cards of hearts and 4 cards of spades are missing from a pack of 52 cards. A card is drawn at random from the remaining pack. What is the probability of</p>	1												

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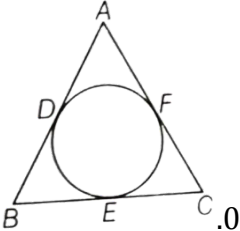
getting a black card?

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- (a) $\frac{22}{52}$ (b) $\frac{22}{46}$ (c) $\frac{24}{52}$ (d) $\frac{24}{46}$

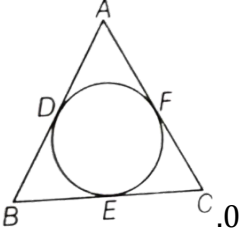
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Direction: In the question numbers 19 & 20 statement of assertion [A] is followed by a statement of Reason [R]. Choose the correct option.

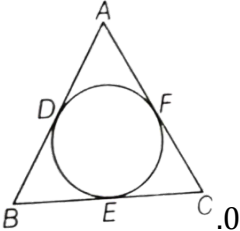
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Q.29	<p>Prove that $\tan(1 - \cot \theta) + (1 -) = 1 + \sec \theta \cdot \operatorname{cosec} \theta$</p>	3												

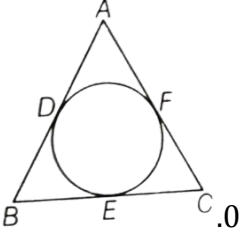
(a) Both A and R are true and R is the correct explanation for A.

(b) Both A and R are true but R is not the correct explanation for A.

Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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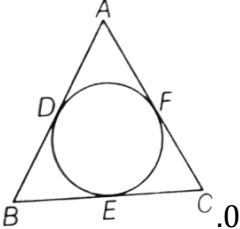
- (c) A is true but R is false.
(d) A is false but R is true.

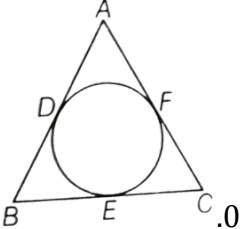
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Q.29	<p>Prove that $\tan(1 - \cot \theta) + (1 -) = 1 + \sec \theta \cdot \operatorname{cosec} \theta$</p>	3												
Q.19	<p>Assertion [A] : $\triangle ABC \sim \triangle DEF$ such that $2AB = DE$ and $BC = 8\text{cm}$ then EF will be</p>	1												

Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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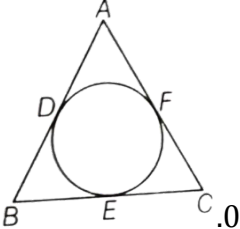
16cm.

Reason [R]: In two similar triangles the corresponding sides are proportional.

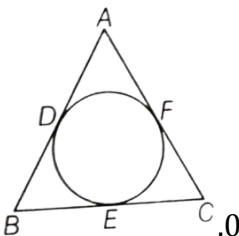
Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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Q.29	<p>Prove that $\tan(1 - \cot \theta) + (1 -) = 1 + \sec \theta \cdot \operatorname{cosec} \theta$</p>	3												
Q.20	<p>Assertion[A]: Two identical cubes of side 'a' are joined end to end. The total surface area of the resulting cuboid is $10a^2$</p>	1												

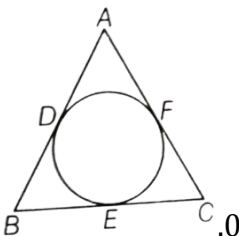
Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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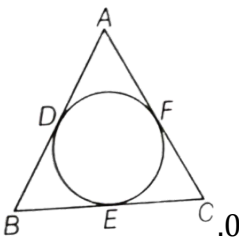
Reason [R] : The total surface area of cube having side 'a' = $6a^2$

Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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Q.28		3												
Q.29	<p>Prove that $\tan(1 - \cot \theta) + (1 -) = 1 + \sec \theta \cdot \operatorname{cosec} \theta$</p>	3												

SECTION B
Section B consists of 5 questions of 2 marks each

Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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Q.26		3												
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Q.28		3												
Q.29	<p>Prove that $\tan(1-\cot \theta) + (1-\) = 1 + \sec \theta \cdot \operatorname{cosec} \theta$</p>	3												
Q.21	<p>Prove that $2 + \sqrt{2}$ is irrational. Given that $\sqrt{2}$ is irrational.</p>	2												

Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2																
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Q.34	<p>The angles of depression of the top and the bottom of an 8m tall building from the top of a multi-storied building are 30° and 45°, respectively. Find the height of the multi-storied building and the distance between the two buildings.</p>	5																
Q.26	<p>instead of shadow. find its length</p> <p style="text-align: center;">OR</p> <p>A straight highway leads to the foot of a tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the tower with a uniform speed. Six seconds later, the angle of depression of the car is found to be 60°. Find the time taken by the car to reach the foot of the tower from this point.</p>	3																
Q.27		3																
Q.35	<p>The median of 80 observations given in the following table is 138. Find the value of 'a' and 'b'.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Class interval</th> <th>Frequency</th> </tr> </thead> <tbody> <tr> <td>65-85</td> <td>5</td> </tr> <tr> <td>85-105</td> <td>a</td> </tr> <tr> <td>105-125</td> <td>13</td> </tr> <tr> <td>125-145</td> <td>20</td> </tr> <tr> <td>145-165</td> <td>b</td> </tr> <tr> <td>165-185</td> <td>10</td> </tr> <tr> <td>185-205</td> <td>7</td> </tr> </tbody> </table>	Class interval	Frequency	65-85	5	85-105	a	105-125	13	125-145	20	145-165	b	165-185	10	185-205	7	5
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Q.29	<p>Prove that $(1 + \cot \theta) + (1 - \cot \theta) = 1 + \sec \theta \operatorname{cosec} \theta$</p>	3																
Section E consists of 3 case based questions of 4 marks each.																		

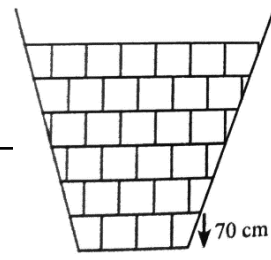
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Q.24	<p>ABC is an isosceles triangle with $AB=AC$ circumscribed about a circle. Prove that BC is bisected at E.</p> <div style="text-align: center;">  </div>	2

Q.25	<p>If the mean of the following distribution is 54 then find the value of P</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Class</td> <td>0-20</td> <td>20-40</td> <td>40-60</td> <td>60-80</td> <td>80-100</td> </tr> <tr> <td>Frequency</td> <td>7</td> <td>P</td> <td>10</td> <td>9</td> <td>13</td> </tr> </table>	Class	0-20	20-40	40-60	60-80	80-100	Frequency	7	P	10	9	13	2
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SECTION C

Q.36	<p>Stadium seating surrounds the centre pitch. Each row in the seating is positioned at a slightly higher level than the one in front of it.</p> <p>A safe seating standing section of a stadium is shown in the figure. There are 20 rows in each section. Each row in a section is 70cm, excluding the seat and has one more seat than the previous row, starting from the second row. The first row has 4 seats.</p>	
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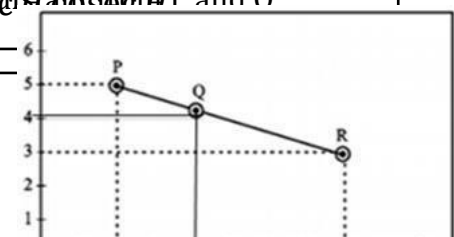
Section C consists of 6 questions of 3 marks each

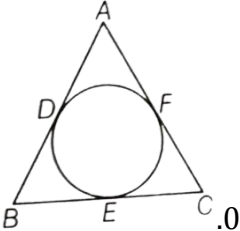
Q.26	<div style="text-align: center;">  </div>	3
Q.27	<p>(a) Aviral is seated in the centre seat of Row 12 in the section. How many seats are on his left?</p> <p>(b) What is the total seating capacity of the section?</p> <p>(c) If one person is standing on row 15 and another is standing on row 1, then find the distance between them.</p> <p style="text-align: center;">OR</p>	3

Q.28	<p>The height of the sections are measured from the foot of the first row to the last row. What is the height of the section?</p>	3
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Q.37	<p>Gaurangi, Aadvik and Aarav go to picnic during holidays. The position of three friends is shown by P, Q and R respectively.</p> <p>a) Find the distance between Q and R.</p> <p>b) Is Q, the midpoint of PR? Justify by finding the midpoint of PR.</p>	
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Q.29	<p>In which ratio Q divides P and R? OR</p> <p>Prove that $\tan^{-1}(\frac{1}{2}) + \tan^{-1}(\frac{1}{3}) = \tan^{-1}(\frac{1}{2})$</p>	3
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Q.23	<p>If $\sin(A+B) = 1$ and $\cos(A-B) = \frac{\sqrt{3}}{2}$, $0^\circ < A+B \leq 90^\circ$ and $A > B$, then find A and B.</p> <p style="text-align: center;">OR</p> <p>If $Y \sin 60^\circ + \cos 30^\circ - \tan 45^\circ = \frac{\sqrt{3}}{2}$, then find the value of Y</p>	2												
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Q.38	<p>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.</p>													
Q.26	<p>A circus tent is cylindrical upto a height of 8 m and conical above it. The diameter of the base is 28 m and total height of tent is 18.5 m.</p>	3 1												
Q.27	<p>Based on the above, answer the following questions:</p> <p>(i) Find slant height of the conical part.</p> <p>(ii) Determine the floor area of the tent.</p> <p>(iii) (a) Find area of the cloth used for making tent.</p> <p style="text-align: center;">OR</p> <p>(b) Find total volume of air inside an empty tent.</p>	1 3 2												
Q.28		3												
Q.29	<p>Prove that $\tan(1-\cot \theta) + (1-\) = 1 + \sec \theta \cdot \operatorname{cosec} \theta$</p>	3												