

Sl. No.

SSLC EXAMINATION, MARCH - 2020

MATHEMATICS

(English)

Time : 2½ Hours

Total Score : 80

INSTRUCTIONS :

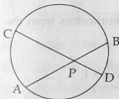
- Read each question carefully before writing the answer.
- Give explanations wherever necessary.
- First 15 minutes is Cool-off time. You may use this time to read the questions and plan your answers.
- No need to simplify irrationals like $\sqrt{2}$, $\sqrt{3}$, π etc., using approximations unless you are asked to do so.

Answer any three questions from 1 to 4. Each question carries 2 scores.

Score

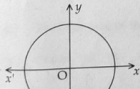
3x2=6

- Write the 6th term of the arithmetic sequence 1, 25, 49, 73, 97,
 - How many perfect square terms are there in the arithmetic sequence 97, 73, 49, ?
- Chords AB and CD are intersecting at P. AB=10 centimetres, PB=4 centimetres and PD=3 centimetres.



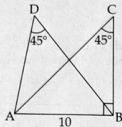
- What is the length of PA ?
 - Find the length of PC.
- Write the polynomial $p(x) = x^2 - 4$ as the product of two first degree polynomials.

- In the figure, O is the centre of the circle and $x^2 + y^2 = 25$ is the equation of the circle.



Answer any five-questions from 5 to 11. Each question carries 3 scores.

5. (a) Write the first term and the common difference of the arithmetic sequence whose algebraic expression is $3n + 5$.
 (b) First term of an arithmetic sequence is 8 and the common difference is 5. Write its algebraic form.
6. In the figure, $\angle ABC = 90^\circ$, $\angle C = \angle D = 45^\circ$, $AB = 10$ centimetres.

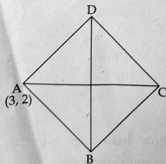


- (a) What is the length of AC ? $10\sqrt{2}$
 (b) What is the radius of the circumcircle of triangle ABC ?
 (c) What is the radius of the circumcircle of triangle ABD ?

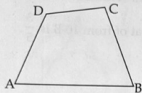
7. Draw a circle of radius 3 centimetres. Mark a point P at a distance 6 centimetres from the centre of the circle. Draw tangents from P to the circle.

8. (a) What is the common difference of the arithmetic sequence $x-1, x, x+1, \dots$?
 (b) If $x-1$ is an even number, which is the next even number ?
 (c) Prove that the product of two consecutive even numbers added to 1 gives a perfect square.

9. In the figure, ABCD is a square. Its diagonals are parallel to the coordinate axes. $AC = 6$ and the coordinates of A is $(3, 2)$ write the coordinates of the vertices C, B and D.

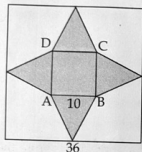


10. In the figure, ABCD is a cyclic quadrilateral. Also $\angle A + \angle D = 210^\circ$, $\angle D + \angle C = 250^\circ$.



- What is $\angle A + \angle C$?
- Find the measures of $\angle A$ and $\angle C$.

11. The figure of a square sheet of paper is shown below. Length of one side of the paper sheet is 36 centimetres and $AB = 10$ centimetres. The shaded portion is cut out and folded into a square pyramid.



- What is the length of the base edge of the pyramid?
- What is the slant height of the pyramid?
- Find the lateral surface area of the pyramid.

Answer any seven questions from 12 to 21. Each question carries 4 scores.

7x4=28

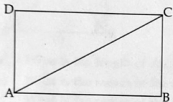
- What is the sum of the first 5 terms of the arithmetic sequence 1, 3, 5, 7,?
 - What is the sum of the first n terms of the arithmetic sequence 1, 3, 5, 7,?
 - Find the sum of the first n terms of the arithmetic sequence $\frac{1}{n}, \frac{3}{n}, \frac{5}{n}, \frac{7}{n}, \dots$
 - What is the sum of first 2020 terms of the arithmetic sequence $\frac{1}{2020}, \frac{3}{2020}, \frac{5}{2020}, \dots$?

13. Draw a rectangle of length 4 centimetres and breadth 2 centimetres. Draw a square having the same area of the rectangle.

14. In a school, the total number of students in 10 A division is equal to the total number of students in 10 B. One student is to be selected from each division. Number of boys in 10 A is 20. The probability of selecting a boy from 10 A is $\frac{2}{5}$ and that of from 10 B is $\frac{3}{5}$.

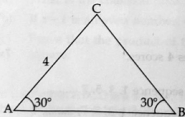
- How many students are there in 10 A ?
- What is the probability of selecting a girl from 10 A ?
- How many boys are there in 10 B ?
- What is the probability of both the selected students being boys ?

15. Perimeter of the rectangle in the figure is 36 centimetres. $AC = \sqrt{164}$ centimetres.



- What is $AB + BC$?
- Find the length of AB .

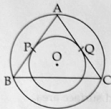
16. In triangle ABC, $\angle A = \angle B = 30^\circ$, $AC = 4$ centimetres.



- What is the length of BC ?
- Find the length of AB .
- In triangle PQR, $PQ = 4\sqrt{3}$ centimetres, $\angle P = \angle Q = 30^\circ$. Draw the triangle.

17. (a) If $p(x) = x^2 - 7x + 13$, What is $p(3)$?
- (b) Write the polynomial $p(x) - p(3)$ as the product of two first degree polynomials.
- (c) Find the solutions of the equation $p(x) - p(3) = 0$.

18. In the figure, O is the centre of both the circles. AB and AC touch the small circle at P and Q. A, B and C are points on the large circle. Score



- (a) If $AP = 5$ centimetres, then what is the length of AQ ?
 (b) Prove that $AB = AC$.
 (c) If $AP = 5$ centimetres and $\angle A = 90^\circ$, then what is the radius of the small circle ?
19. Draw the coordinate axes and mark the points $A(-3, 0)$, $B(3, 0)$ and $C(0, 3\sqrt{3})$.
20. A sector of radius 12 centimetres and central angle 120° is rolled up into a cone.
 (a) What is the slant height of the cone ?
 (b) Find the radius and the height of the cone.
 (c) What is the central angle of the sector to be used to make a cone of base radius $\sqrt{2}$ centimetres and height 4 centimetres ?
21. (a) What is the slope of the line passing through the points $(5, 0)$ and $(3, 2)$? Write the equation of the line.
 (b) The x coordinate of a point on the line $x - y = 5$ is 5. What is the y coordinate of that point ?
 (c) Write the coordinates of the point of intersection of the lines $x + y = 5$ and $x - y = 5$.

Answer any five questions from 22 to 28. Each question carries 5 scores.

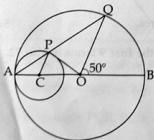
5x5=25

22. Sum of the first 4 terms of an arithmetic sequence is 72. Sum of the first 9 terms is also 72.
 (a) What is the 5th term of the sequence ?
 (b) Find the sum of the first five terms.
 (c) Write the sequence.
23. A boy standing at the edge of a canal sees the top of a tree on the other edge at an elevation of 60° . Stepping 12 metres back, he sees it at an elevation of 30° . Find the height of the tree.
24. In $\triangle ABC$, $AB = 5$ centimetres, $\angle A = 65^\circ$, $\angle B = 55^\circ$. Draw the triangle ABC and draw the incircle. Measure the radius of the incircle.

25. A circle is drawn with $(5, 3)$ as centre. $(5, 6)$ is a point on the circle.
- What is the radius of the circle?
 - Write the equation of the circle.
 - What is the distance from the centre of the circle to the x -axis?
 - What is the length of the tangents from the origin to the circle?
26. (a) The radius of a solid sphere is 6 centimetres. Find its volume and surface area.
- (b) It is cut into two equal halves. What is the total surface area of each hemisphere? What is the volume of a hemisphere?
27. The table below shows, children of a class sorted according to their marks in an examination.

Marks	Number of Children
0-10	4
10-20	7
20-30	10
30-40	12
40-50	8
	41

- (a) If we arrange the children from the one with the least mark to the one with the greatest, then what will be the assumed mark of the 12th student?
- (b) Compute the median mark.
28. In the figure, O is the centre of the large circle. Centre of the small circle is C . OP is a tangent to the small circle. $\angle BOQ = 50^\circ$.



- $\angle OAQ = \dots\dots\dots$
- $\angle OCP = \dots\dots\dots$
- $\angle APO = \dots\dots\dots$
- $\angle POQ = \dots\dots\dots$

Score

29. Read the following Passage. Understand the Mathematical concept in it and answer the questions that follow. Each question carries 1 score.

6x1=6

The common difference of the arithmetic sequence 15, 14, 13, 12, is $14 - 15 = -1$. First term of the sequence is 15 and the 15th term is $15 + 14 \times -1 = 15 - 14 = 1$.

Similarly the 4th term is 12 and the 12th term is 4.

Its 16th term is, $x_{16} = 15 + 15 \times -1 = 15 - 15 = 0$. So the sum of the first 31 terms is also zero. That is if the n^{th} term of an arithmetic sequence with common difference -1 is m , then the m^{th} term is n and the $(m+n)^{\text{th}}$ term is zero.

- (a) Seventh term of an arithmetic sequence is 10 and the 10th term is 7. What is the common difference ?
- (b) What is the 21st term of the arithmetic sequence 21, 20, 19, ?
- (c) 5th term of an arithmetic sequence is 17 and the 17th term is 5. Which term of the sequence is zero ?
- (d) 5th term of an arithmetic sequence is 17 and the 17th term is 5. What is the 44th term ?
- (e) First term of an arithmetic sequence is n and the n^{th} term is 1. What is the $(n+1)^{\text{th}}$ term ?
- (f) The first term of an arithmetic sequence is n and the n^{th} term is 1. Sum of how many terms, starting from the first term, of this sequence is zero ?

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