Sl. No.

SSLC EXAMINATION, MARCH - 2022

MATHEMATICS

(English)

Time : 2½ Hours Total Score : 80

General Instructions to Candidates :

- There is a 'Cool-off time' of **15** minutes in addition to the writing time. Use this time to get familiar with questions and to plan your answers.
- Questions with different scores are given as distinct parts.
- Read the instructions carefully before answering the questions.
- Keep in mind, the score and time while answering the questions.
- The maximum score for questions from **1** to **35** will be **80**.
- No need to simplify irrationals like $\sqrt{2}$, $\sqrt{3}$, π etc., using approximations unless you are asked to do so.

Score

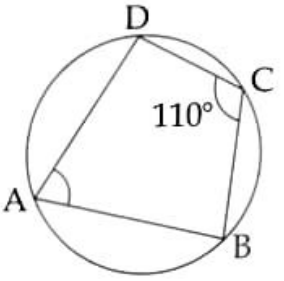
PART - I

Questions from 1 to 10 carries 1 score each.

(A) Answer any 4 questions from 1 to 6. **4x1=4**

1. What is the common difference of the Arithmetic sequence 3, 7, 11, ... 1

2. 1



In the figure $\angle C = 110°$. Find the measure of $\angle A$.

3. A box contains 7 white balls and 3 black balls. If a ball is taken from it, what is the probability of it being black ? 1

4. Find the distance between the points (0, 0) and (4, 0). 1

Score

5. From the circle of radius 12 centimetres, a sector of central angle 90° is cut out and made into a cone. What is the base radius of this cone ? 1

6. If $(x-1)$ is a factor of the polynomial $p(x)$, write $p(1)$. 1

(B) Answer all questions from 7 to 10. Choose the correct answer from the brackets. **4x1=4**

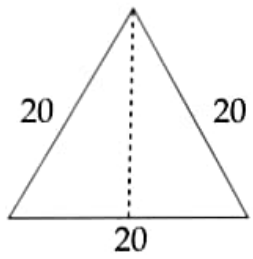
7. What is the value of $\tan x$ if $x = 30°$? 1

$\left(\frac{1}{2};\ \frac{1}{\sqrt{2}};\ \frac{1}{\sqrt{3}};\ \sqrt{3}\right)$

8. If the perimeter of a triangle is 24 centimetres and its inradius is 2 centimetres, find its area in square centimetres. 1

(12; 20; 24; 26)

9. The lateral faces of a square pyramid are equilateral triangles. If the length of one base edge is 20 centimetres, what will be the measure of its slant height in centimetres ? 1



$(10;\ 10\sqrt{2};\ 10\sqrt{3};\ 20)$

10. The equation of a line is $2x + y = 5$ if the x co-ordinate of a point on this line is 2, what is the y co-ordinate of this point ? 1

$(0;\ 1;\ -1;\ 2)$

PART - II

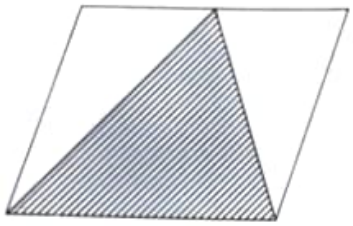
Questions from 11 to 18 carries 2 scores each.

(A) Answer any three questions from 11 to 15. **3x2=6**

11. 5, 8, 11, ... is an arithmetic sequence.
    (a) What is 20^{th} term ? 1
    (b) What is the algebraic expression for this sequence ? 1

Score

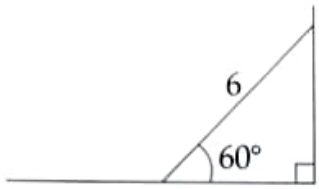
12. A triangle is drawn by joining the mid-point of one side of a parallelogram and the endpoints of the opposite side. The triangle is shaded as shown in the figure.



(a) What is the area of the triangle, if the area of the parallelogram is 50 square centimetres ? 1

(b) Find the probability of a dot put without looking, to be within the triangle. 1

13.



A ladder leans against a wall. The ladder makes an angle 60° with the floor. Length of the ladder is 6 metres.

(a) What is the height of the top of the ladder from the ground ? 1

(b) How far is the foot of the ladder from the wall ? 1

14. Write the second degree polynomial $x^2 + x$ as the product of two first degree polynomials. 2

15. The weight of 7 pupils in a class are given (in kilograms). Find the median weight. 2

35, 43, 38, 45, 32, 44, 42

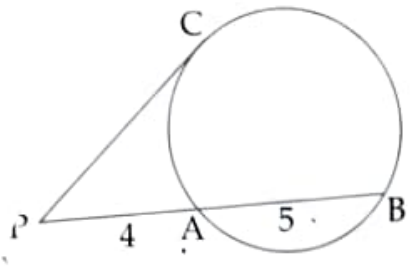
(B) Answer any 2 questions from 16 to 18. **2x2=4**

16. The algebraic expression for the sum of n terms of an arithmetic sequence is $n^2 + n$.

(a) Find the first term of this arithmetic sequence. 1

(b) Find the sum of first 10 terms of this arithmetic sequence. 1

Score

17. 

2

In the figure PA = 4 centimetres, AB = 5 centimetres and PC is a tangent to the circle. Find the length of PC.

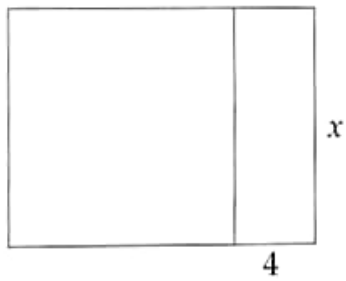
18. Find the coordinates of the point which divides the line joining the points (1, 2) and (7, 5) in the ratio 2 : 1. 2

PART - III

Questions from 19 to 25 carries 4 scores each.

(A) Answer any three questions from 19 to 23. **3x4=12**

19. Draw a triangle of circumradius 3 centimetres and two of its angles 50° and 60°. 4

20. 

A strip of width 4 centimetres is attached to one side of a square to form a rectangle. The area of the new rectangle is 77 square centimetres.

(a) If we take the width of the new rectangle as x, what will be its length ? 1

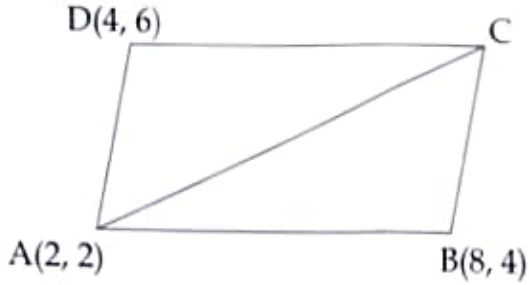
(b) Find the measure of the side of the square by constructing an equation. 3

21. Draw a circle of radius 2.5 centimetres and mark a point 6 centimetres away from the centre of the circle. Draw tangents to the circle from this point. 4

22. Find the surface area of a cone having base radius 9 centimetres and height 12 centimetres. 4

Score

23.



The coordinates of three vertices of a parallelogram are given.

(a) Find the coordinates of the vertex C. **2**

(b) Find the coordinates of the midpoint of the diagonal AC. **2**

(B) Answer any one of the questions 24, 25. **1x4=4**

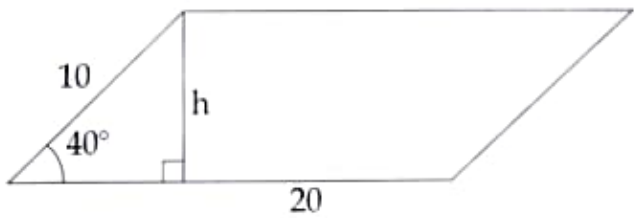
24. A box contains four slips numbered 1, 2, 3, 4 and another box contains five slips numbered 5, 6, 7, 8, 9. If one slip is taken from each box.

(a) How many number pairs are possible ? **1**

(b) What is the probability of both being odd ? **1**

(c) What is the probability of getting the sum of the numbers 10 ? **2**

25.



Two sides of a parallelogram are 20 centimetres and 10 centimetres. If the angle between them is 40°,

(a) What is the height of the parallelogram ? **2**

(b) Find the area of the parallelogram. **2**

(sin 40 = 0.64 ; cos 40 = 0.77 ; tan 40 = 0.84)

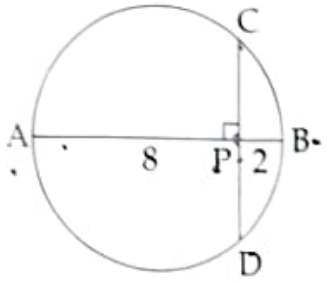
Score

PART - IV

Questions from 26 to 32 carries 6 scores each.

(A) Answer any three questions from 26 to 29. **3x6=18**

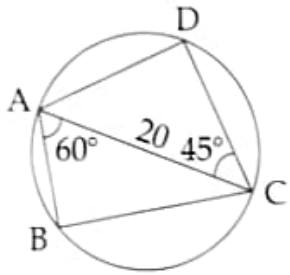
26. (a)



In the figure AB is the diameter of the circle. Line CD is perpendicular to AB. AP = 8 centimetres and PB = 2 centimetres. Find the length of PC. **2**

(b) Draw a rectangle of sides 5 centimetres and 3 centimetres. Draw a square of the same area. **4**

27.

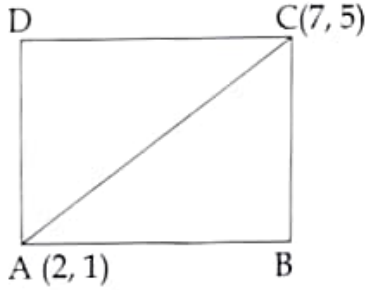


In the figure AC is the diameter of the circle. Given that AC = 20 centimetres, $\angle BAC = 60°$ and $\angle ACD = 45°$.

(a) What is the measure of $\angle ADC$? **1**

(b) Find the perimeter of the quadrilateral ABCD. **5**

28.



The rectangle has sides parallel to the axes. The co-ordinates of one pair of opposite vertices are (2, 1) and (7, 5).

(a) Find the co-ordinates of the other two opposite vertices. **2**

(b) Find the length and breadth of the rectangle. **2**

(c) Find the length of the diagonal AC. **2**

Score

29. The radius of a solid metal sphere is 6 centimetres.

(a) Find the volume of the sphere. 3

(b) This sphere is melted and recast into a solid cone of radius 6 centimetres. Find the height of the cone. 3

(B) Answer any two questions from 30 to 32. **2x6=12**

30. The product of a number and 5 more than that number gives 104.

(a) If we take the first number as 'x', what will be the second number ? 1

(b) Form a second degree equation using the given details. 2

(c) Find the number. 3

31. Consider the second degree polynomial $p(x)=x^2-3x+5$.

(a) Find $p(1)$. 1

(b) Write one first degree factor of the polynomial $p(x)-p(1)$. 1

(c) Write $p(x)-p(1)$ as the product of two first degree factors and find the solutions of the equation $p(x)-p(1)=0$. 4

32. The table below shows the households of an area sorted according to consumption of electricity.

Consumption (in units)	Number of households
100 - 120	4
120 - 140	8
140 - 160	7
160 - 180	10
180 - 200	6
200 - 220	4
220 - 240	6

(a) If the households are arranged according to the consumption of electricity, the consumption of which house is taken as median ? 1

(b) What is the consumption of 20^{th} household according to our assumption ? 2

(c) What is the median consumption ? 3

Score

PART - V

Questions from 33 to 35 carries 8 scores each.

(A) Answer any two questions from 33 to 35. **2x8=16**

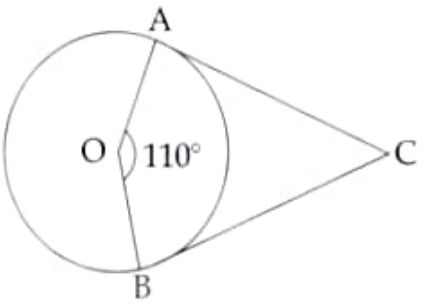
33. 6, 10, 14, ... is an arithmetic sequence.

(a) Find the sum of the first 15 terms of this arithmetic sequence. **4**

(b) What is the difference between the first term and the 16^{th} term ? **2**

(c) Find the difference between the sum of first 15 terms and sum of the next 15 terms. **2**

34. (a) **2**



The two tangents AC and BC of the circle with centre O meets at C. What is the measure of $\angle OAC$? If $\angle AOB = 110°$ find the measure of $\angle ACB$.

(b) Draw a circle of radius 2.5 centimetres. Draw a triangle with angles 50°, 60°, 70° and all its sides are tangents to this circle. **6**

35. (a) Draw the coordinate axes and mark the points (2, 1) and (4, 3). **3**

(b) Find the slope of the line joining these points. **2**

(c) The centre of a circle is (3, 2) and the coordinates of one end of its diameter is (1, 2). Find the coordinates of the other end of the diameter. **3**

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