

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  $\sqrt{2}$ ,  $\sqrt{3}$ ,  $\pi$  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.

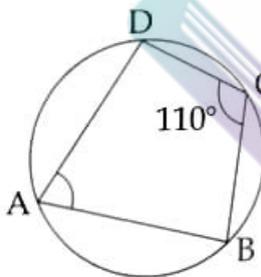
4x1=4

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

1

2.

1

In the figure  $\angle C = 110^\circ$ . 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

P.T.O.

5. From the circle of radius 12 centimetres, a sector of central angle  $90^\circ$  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

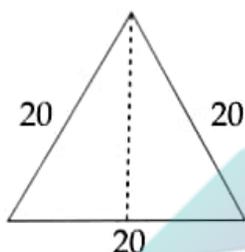
7. What is the value of  $\tan x$  if  $x = 30^\circ$ ? 1

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

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

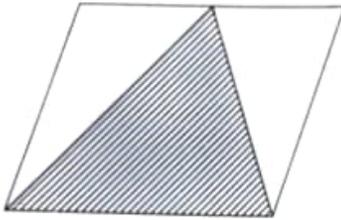
11. 5, 8, 11, ... is an arithmetic sequence.

(a) What is 20<sup>th</sup> term? 1

(b) What is the algebraic expression for this sequence? 1

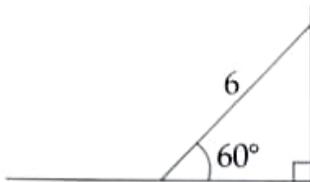
Score

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  $60^\circ$  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.

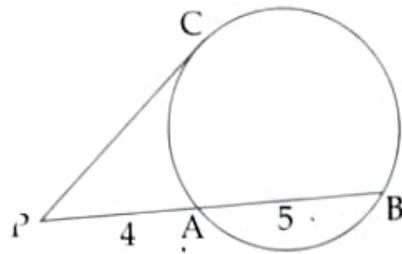
2x2=4

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

P.T.O.

27.



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

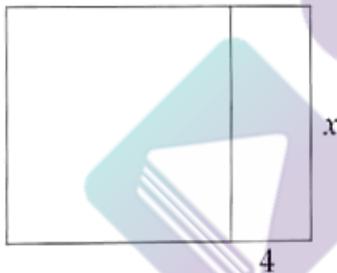
### PART - III

Questions from 19 to 25 carries 4 scores each.

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

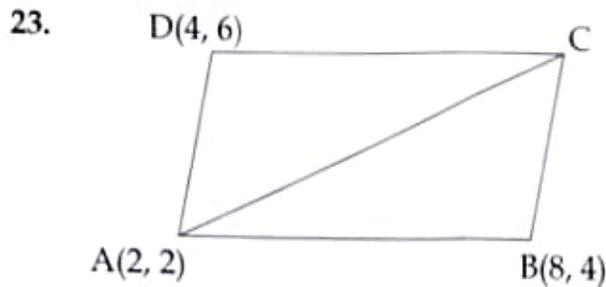
19. Draw a triangle of circumradius 3 centimetres and two of its angles  $50^\circ$  and  $60^\circ$ . 4

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



The coordinates of three vertices of a parallelogram are given.

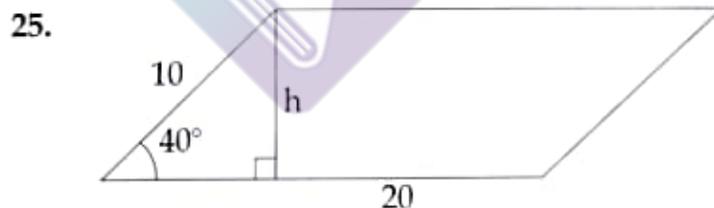
- (a) Find the coordinates of the vertex C. 2
- (b) Find the coordinates of the midpoint of the diagonal AC. 2

(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



Two sides of a parallelogram are 20 centimetres and 10 centimetres. If the angle between them is  $40^\circ$ ,

- (a) What is the height of the parallelogram? 2
- (b) Find the area of the parallelogram. 2

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

## PART - IV

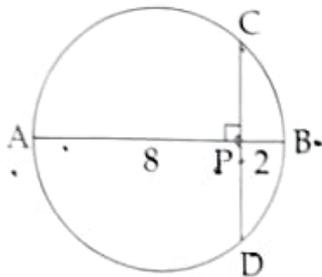
Questions from 26 to 32 carries 6 scores each.

(A) Answer any three questions from 26 to 29.

3x6=18

26. (a)

2

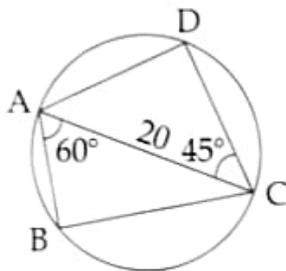


In the figure AB is the diameter of the circle. Line CD is perpendicular to AB. AP = 8 centimetres and PB = 2 centimetres. Find the length of PC.

(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,  $\angle BAC = 60^\circ$  and  $\angle ACD = 45^\circ$ .

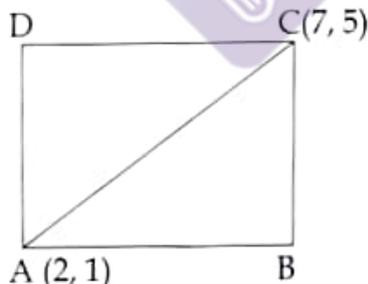
(a) What is the measure of  $\angle ADC$ ?

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<sup>th</sup> household according to our assumption? 2
- (c) What is the median consumption? 3

## PART - V

Questions from 33 to 35 carries 8 scores each.

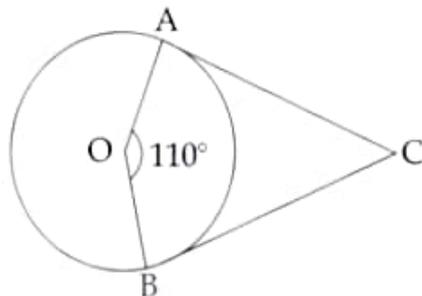
(A) Answer any two questions from 33 to 35.

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<sup>th</sup> 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  $\angle AOB = 110^\circ$  find the measure of  $\angle ACB$ .

- (b) Draw a circle of radius 2.5 centimetres. Draw a triangle with angles  $50^\circ$ ,  $60^\circ$ ,  $70^\circ$  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