SSLC Model Evaluation 2019-'20

KP(G)
Std. 10

Mathematics

Time : 2½ hrs
Score : 80

Instructions

* Read the instruction carefully before answering each question
* Necessary steps should be written against each answer
* Simplifcation using approximate values of $\pi, \sqrt{2}, \sqrt{3}$, need to be done only if specifically asked
* First 15 minutes is cool off time.

Answer any five of the following six questions. 2 marks each (5 x 2 = 10)

1. Find 15th term of the arithmetic sequence 10, 16, 22, ...

2. In quadrilateral ABCD, $\angle A = 100°$, $\angle B = 120°$, $\angle C = 50°$ with respect to the circle with AC as diameter, locate the position of B and D.
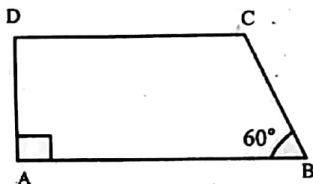
3.

Quadrilateral ABCD is a trapezium. AD is perpendicualr to AB. $\angle B = 60°$, BC = 8cm, CD = 10cm. Find length of the sides AD and AB.

4. (3, 4) is a point on a circle with centre and the origin
   a. What is the radius of the circle
   b. Find co-ordiantes of the points where the circle cuts y - axis.

5. Slant height of a circular cone is 15cm and height is 9cm. Find basc area of the cone.

6. (1, 3) is a point on a line passing through the origin.
   a. Find slope of the line
   b. (2, a) is a point on the line, then find a.

Answer any five of the following from 7 to 13. 3 marks each (5 x 3 = 15)

7. Scores of the students in a class are given in the table below.

Score	5	8	10	15	20	25	35	40
No. of Students	2	5	7	10	8	5	3	2

Calculate mean and median of scores

8. Write $2x^2 - 5x + 2$ as the product of two first degree polynomials.

9. In the arithmatic sequence ; $\frac{11}{8}, \frac{14}{8}, \frac{17}{8}$ ....
   a. Find nth term
   b. Find first natural number term in the above sequence.

10.   In $\triangle ABC$, $AB = AC$. Prove that, incircle of the triangle touches the side BC at its midpoint.

11.   All the edges of a square pyramid are equal. Length of one lateral edge is 12cm.
   a.   Calculate slant height and height
   b.   Write the ratio of base edge, height, and slant height.

12.   Product of a term and its term position of an arithmatic sequence 7, 11, 15, ...is 280. Find the term position of the term.

13. a.   Find the sum of all natural numbers in between 1 and 15.
   b.   nth term of an arithmatic sequence is $7n + 3$. Find sum of all 15 terms of this sequence.

Answer any six of the questions from 14 to 21. 4 marks each (6x4 = 24)

14.
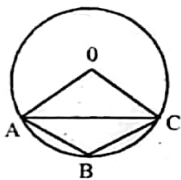
In the figure 'O' is the centre of the circle.
   a.   Prove that $\angle AOC = 2 [\angle BAC + \angle BCA]$
   b.   If $\angle AOC = \angle ABC$, then find all the angles of $\triangle AOC$.

15.   A vessel contains 20 paperslips having numbers 1 to 20 with one number in one slip each. Another vessal contain 25 paperslips having number 1 to 25. If one slip each is drawn from each vessel.
   a.   What is the probability of getting same number?
   b.   What isthe probability of getting two odd numbers?
   c.   What is the probability of getting two prime numbers?
   d.   What is the probability of getting two perfect squares?

16.   In $\triangle ABC$, perpendicular distance from C to AB is 12cm.
     $Tan A = \frac{3}{4}$, and $Tan B = \frac{4}{3}$
   a.   Find length of AB
   b.   Find area of $\triangle ABC$
   c.   Prove that $\triangle ABC$ is a right triangle.

17.   Lengths of two small sides of a triangle are in the ratio 1 : 2. Length of third side is 2c more than length of the medium side. When all the sides are increased by 1cm, then the triangle becomes a right triangle.
   a.   If x is the smallest side of the first triangle, then what are the length of other two sides.
   b.   Form a second degree equation and find length of the sides of the first triangle.

18. In $\triangle ABC$, $AB = 6.5$cm, $\angle A = 70°$, $AC = 6$cm. Construct the triangle and hence construct its incircle. Measure the inradius.

19. $P(x) = 9x^2 + bx + c$.
   a. Prove that $(x-r)$ is a factor of $P(x) - P(r)$
   b. Find solution of $x^2 + 4x + 2 = 0$.
   c. Write $P(x) = x^2 + 4x + 2$ as the product of two first degree polynomials.

20. Daily wages of labours in a company are given in the table below.

Wages	200-400	400-600	600-800	800-1000	1000-1200
No. of Labourers	8	12	20	15	6

   a. If the labours are arranged according to their daily wages, which labour's wage will be median wage.
   b. Find median class
   c. What is the wage of 21st labours
   d. Find median wage of the labours in the company.

21. a. $2x - 3y + 1 = 0$; and $x - 2y + 2 = 0$ are two lines. Find co-ordiantes of point A of intersection of these two lines
   b. Write the equation of the circle with centre at the origin and passing through A.

   Answer any 5 questions from 22 to 28. 5 marks each. (5x5 = 25)

22. Sum of first 11 terms of an arithmetic sequence is 275 and sum of next 9 terms is 585.
   a. Find 6th term of the sequence
   b. Find 16th term of the sequence
   c. Find first term and common difference of the sequence.
   d. Write algebra of the seqeuence

23. Construct a square of area 36 sq.cm. Hence construct a rectangle having same area of the square and one side 7cm.

24. From the top of building on a levelground, a flagpost of height 8m is mounted vertically. A child on the ground far away from the building sees the foot of the flag post at an angle of elevation 65° and top of the flagpost at an angle of elevation 70°. Height of the child is 1.5m.
   a. Draw a rough figure and mark the given measures.
   b. Find height of the building.
   (Sin 65° = 0.91 ; Cos 65° = 0.42; Tan 65° = 2.14
   Sin 70° = 0.94; Cos 70° = 0.34; Tan 70° = 2.75)

25. A and B are two points with co-ordinates A(-1, 2) and B(5, -6). If a circle is drawn with AB as diameter
   a. Find the co-ordinates of the centre of circle
   b. If C is a point C(-2,1), then prove that $\triangle ABC$ is a right triangle.
   c. Find perimeter of $\triangle ABC$

26. In $\triangle ABC$, $AB = 6cm$, $\angle A = 65°$, $AC = 5cm$. Construct the triangle and hence construct a square having same area of the triangle.

27. A solid is in the shape of a circular cone with a hemisphere at its base. Total height of the pyramid is 23cm and slant height of the cone is 17cm.
    a. What is the radius of the hemisphere?
    b. What is the volume of the solid?

28. For the circle $x^2 + y^2 - 10x - 12y + 24 = 0$.
    a. Find co-ordinates of centre of the circle
    b. Find radius of the circle.
    c. Find the co-ordinates of the points where the cuts with x axis and y axis

29. Read the following description and understand. Hence write the answers for the following questions.

    You know very well about the perfect squares. 1, 4, 9, 16, 25, 36, ...are the perfect squares.

    Find the remainders obtained when the perfect squares are divided by 7.

    When 1 is divided by 7, the remainder is 1

    When 4 is divided by 7, the remainder is 4.

    When 9 is divided by 7, the remainders is 2.

    Repeat this for other perfect squares also.
    a. When 16, 25 and 36 are divided by 7, what will be the remainder.
    b. What are the remainders when the perfect squares are divided by 7.
    c. When the perfect squares are divided by 7. What are the numbers less than 7, which are not the remainders.
    d. What are the remainders when the terms of the arithmatic sequence 10, 17, 24, ...are divided by common difference (7)
    e. Is there any perfect square term in the arithmatic sequence 10, 17, 24, ...
    d. Write an arithmatic sequence with common difference 7 and haven't any perfect square term. $1 \times 6 = 6$