(Pages : 7)

ME 527

Sl. No.

SSLC MODEL EXAMINATION, FEBRUARY - 2018.

MATHEMATICS

(English)

Time : 2½ Hours

Total Score : 80

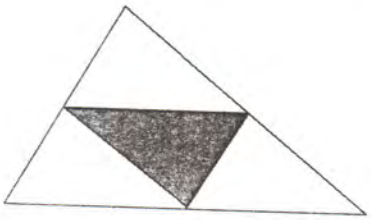
Instructions :

- Read each questions carefully before writing the answers.
- Give explanations wherever necessary.
- First 15 minutes is cool off time.
- No need of simplify irrationals like $\sqrt{2}$, $\sqrt{3}$, π etc. using approximations unless you are asked to do so.

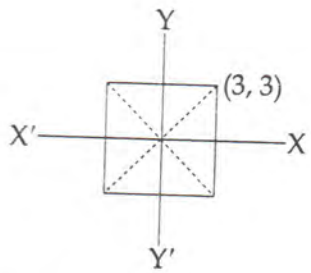
Score

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

1. The 25^{th} term of an arithmetic sequence is 140 and the 27^{th} term is 166. What is its common difference ? What is its 35^{th} term ?

2. 

In the figure, the shaded triangle is drawn by joining the mid point of the sides of large triangle calculate the probability of a dot put on larger triangle to be within the shaded triangle.

3. 

In the figure, the sides of the square are parallel to the axes and the origin is the mid point. Coordinates of one vertex of the square is (3, 3). Write the coordinates of two other vertices of the square.

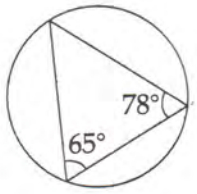
P.T.O.

Score

4. The ages of 10 members of a club are 20, 25, 22, 32, 42, 27, 35, 27, 35 and 30. Find the median age.

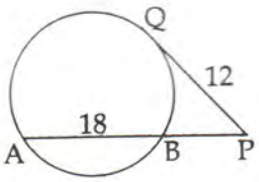
Answer any 5 from question 5 to 11. Each question carries 3 marks.

5.



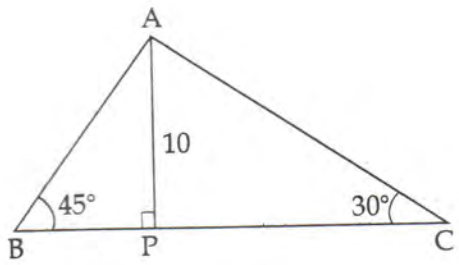
Draw a circle with radius 4 centimetres. Draw a triangle with two of its angles 65° and 78° and all vertices on the circle.

6.



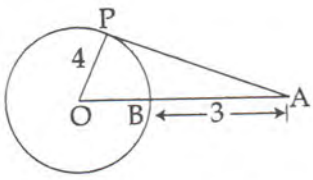
In the figure, the length of the chord AB is 18 centimetre. The chord is extended to P and the tangents drawn from that point, have length 12 centimetres. Find the length of BP.

7.



In triangle ABC, the length of AP is 10 centimetres. What is the length of BP ? What is the length of PC ? Calculate the length of BC.

8.



AP is the tangent to the circle with centre at O and radius 4 centimetres. AB = 3 cm. Find the length of OA and the length of the tangent AP.

Score

9. The radius of two spherical tanks are in the ratio 3 : 4. The volume of the first tank is 540 litres. Find the volume of the second tank.

10. Write $P(x) = x^2 - 9x + 20$ as a product of two first degree polynomials. Write also the solutions of the equation $P(x) = 0$.

11. Find the slope of line joining (2, 4) and (4, 7). Write the coordinate of another point on the line. Check whether (5, 8) is on this line.

Answer any 7 from question 12 to 21. Each question carries 4 marks.

12. Sum of the first five terms of an arithemetic sequence is 45. What is the third term ?

The common difference of the sequence is 4. Write the first two terms. Write another arithemetic sequence having the sum of the first five term 45.

13. Draw a rectangle of area 18 square centimetre. Draw a square of the same area.

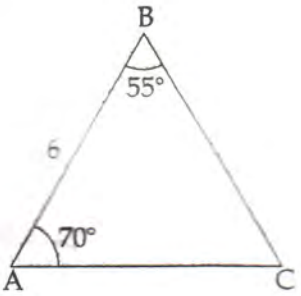
14. From all two digit numbers with each digit 1, 2, 3, 4 or 5 one number is chosen :

(a) What is the probability of both digits being the same ?

(b) What is the probability of the sum of the digits being 8 ?

(c) What is the probability that it is a multiple of 5 ?

15.



In triangle ABC, length of AB = 6 cm, $\angle A = 70°$, $\angle B = 55°$.

(a) Find $\angle C$

(b) Find AC

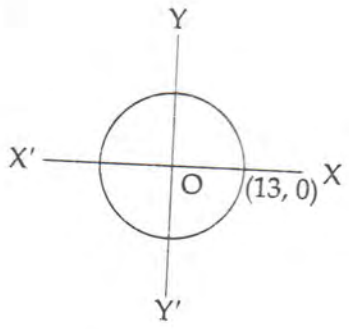
(c) Find the area of triangle ABC

($\sin 70° = 0.93$)

P.T.O.

Score

16.



The centre of the circle shown is the origin and the radius is 13.

(a) Check whether each of the points (12, 5), (10, 6) is inside, outside or on the circle.

(b) Write the coordinates of two other points on the circle.

17. Calculate the area and perimetre of a triangle of sides 30 centimetre, 28 centimetre and 26 centimetre. Also calculate the radius of the incircle.

18. A square pyramid of base edge 10 centimetres and height 12 centimetres is to be made of paper.

(a) Calculate the slant height of the pyramid.

(b) What is the area of the paper needed to make square pyramid ?

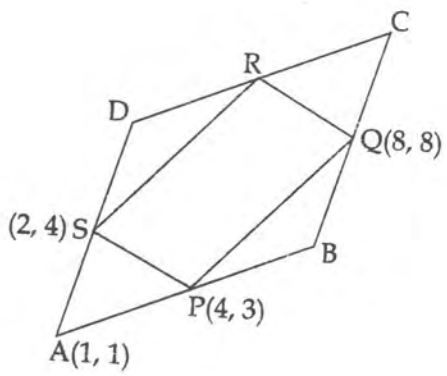
19. $P(x) = ax^3 + bx^2 + cx + d$

(a) Find $P(-1)$.

(b) If $x+1$ is a factor of $P(x)$ then prove that $a + c = b + d$.

(c) Write a third degree polynomial having $(x+1)$ as a factor.

20.



In the picture, mid points of the sides of the quadrilateral ABCD are joined to draw PQRS.

(a) Find Coordinates of R.

(b) Write Coordinates of all vertices of quadrilateral ABCD.

(Contd.....)

Score

21. Some households in a locality are sorted according to their electricity usage in the table below.

Usage of electricity (Unit)	No. of households
80 - 100	8
100 - 120	12
120 - 140	10
140 - 160	9
160 - 180	6

(a) If the household using the least unit of electricity is numbered as one and the second least as two and so on, what is assumed to be usage of electricity of the 21st household.

(b) Calculate the median usage of electricity ?

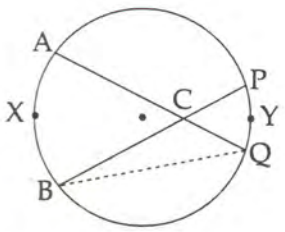
Answer any 5 from question 22 to 28. Each question carries 5 marks.

22. (a) Find the least and heighest three digit number which leave a remainder 1 on division by 9.

(b) How many three digit numbers are there, which leave a remainder one on division by 9 ?

(c) Find the sum of all such numbers.

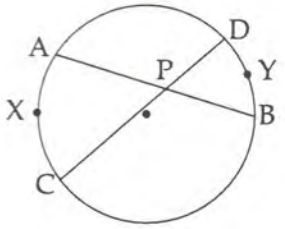
23.



In the circle shown, the chords AQ and BP passes through C.

(a) The central angle of arc AXB is 100° calculate ∠Q. The central angle of arc PYQ is 60°. Find all angles of the triangle BQC.

(b)

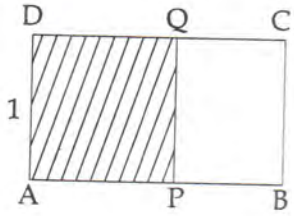


In the picture, prove that ∠APC is half the sum of the central angle of arc AXC and arc BYD.

P.T.O.

Score

24.



From the rectangle ABCD of breadth 1 metre, the largest possible square APQD is cut off. The remaining rectangle is PBCQ.

(a) Taking the length of ABCD as x, write the length and breadth of PBCQ.

(b) The ratio of length and breadth of the rectangles. ABCD and PBCQ are same. Find length of AB.

25. A man standing on the top of a light house sees a ship approaching the seashore at an angle of depression of 22°. After the ship has travelled 100 metres more. Towards the sea shore, he sees it at an angle of depression of 31°. The ship stops there.

(a) Draw a rough-sketch.

(b) How far is the ship from the light house.

(c) Find the height of light house.

$\tan 22° = 0.4$, $\tan 31° = 0.6$

26. Draw a triangle of sides 6 centimetre, 7 centimetre and 8 centimetre. Draw a circle which touches all sides of the triangle and measure its radius.

27. A cone is made from sector of radius 10 centimetre and central angle 216°.

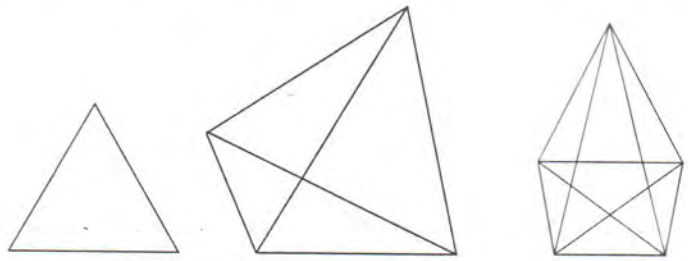
(a) What is slant height and radius of the cone ?

(b) Find the volume of the cone.

28. Find the length of line joining A(−2, −3) and B(4, 5). Write the equation of circle whose diametre is AB.

Score

29. **Read the mathematical concept given below carefully and understand it. Then answer the following questions.** 1x6=6



Diagonal of a polygon is a line joining two non-adjacent vertices see this tables.

Number of sides of polygon	Number of diagonals drawn from one vertex	Total Number of Diagonals
Triangle 3	0	$0 = \frac{3 \times 0}{2}$
Quadrilateral 4	1	$2 = \frac{4 \times 1}{2}$
Pentagon 5	2	$5 = \frac{5 \times 2}{2}$

From the above table, we see the relationship between the number of sides of a polygon and the number of diagonals.

Answer the question's given below :

(a) Which polygon has the same number of sides and diagonals ?

(b) How many diagonals can be drawn from a single vertex of an 8 - sided polygon ?

(c) How many diagonals does 20 sided polygon have ?

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