**KANNUR DISTRICT PANCHAYATH**
**DIET KANNUR**
**SSLC MUKULAM MODEL EXAMINATION -2018**

Time : 2½ hrs **MATHEMATICS** Total Score :80

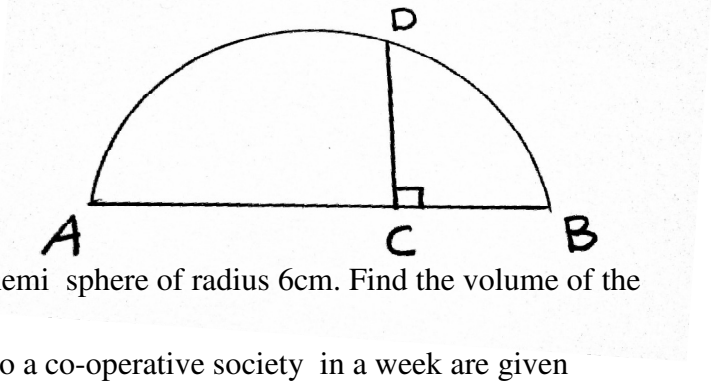
**Instructions:**

- Read the questions carefully, understand each question and then answer the questions.
- Give explanations wherever necessary.
- 15 minutes will be given at the beginning as cool off time. This time may be utilized to read and understand the questions.
- Simplifications using $\pi$ , $\sqrt{2}$ , $\sqrt{3}$ etc .with their approximate value is not required if not specified in the question.

**Answer any three from questions 1 to 4. Each question carries 2 scores (3x2=6)**

1. a) Find the sum of first 20 counting numbers.
   b) Find the sum of first 20 terms of the arithmetic sequence 5,10,15……

2. In the figure, AB is a diameter. CD=12cm, length of BC is 10cm less than that of AC. Find the length of AB.

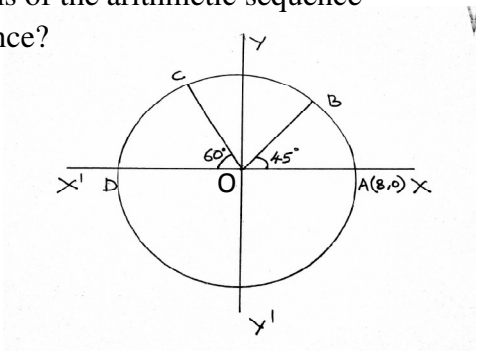



3. A cone of maximum size is carved out from a solid hemi sphere of radius 6cm. Find the volume of the cone.
4. The quantities of milk in litres suppiled by a farmer to a co-operative society in a week are given below.
   22,18,17,15,25,24,19
   Calculate the mean and median quantities of milk.

**Answer any five from questions 5 to 11. Each carries 3 scores (5x3=15)**

5. Is it possible to get a difference of 100 between any two terms of the arithmetic sequence 8,15,22……? What is the position of 351 in this sequence?

6. In the fig,'O' is the centre of the circle. If A(8,0) <AOB= $45^0$ and <DOC =$60^0$, find the co-ordinates of B and C.



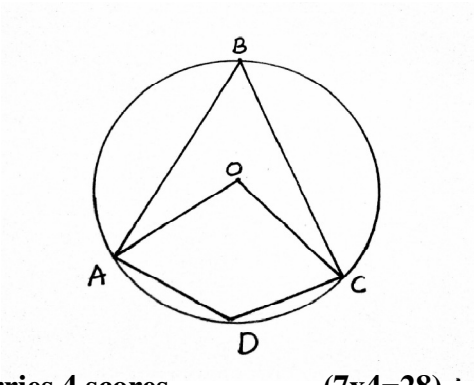

7. Draw a circle of radius 3cm. Mark a point P at a distance 7 cm from the centre. Draw the tangents from P to the circle. Measure lengths of the tangents.

8. When the reciprocal of a number is subtracted from the number, $\frac{16}{15}$ is got. What is the number?

9. If (x-2) is a factor of $x^3 - 2x^2 + kx + 10$,
   a) Find the value of k
   b) Find the remainder on dividing this polynomial by (x+1)?

10. P(2,3) , Q(8,15) and R(5,10) are vertices of a triangle.
   a) Find the co-ordinates of the midpoint of PQ.
   b) Find the co-ordinates of the centriod of the triangle PQR

11. In the Figure A,B C and D are points on a circle with centre 'O'. The angle formed by the arc ADC at the centre is $100^0$.Then,
   a) How much is <ABC
   b) How much is <ABC + <ADC
   c) If <OAB =$30^0$, what is the measure of <OCB?




**Answer any seven from questions 12 to 21. Each question carries 4 scores (7x4=28)**

12. There are 50 students in a class. Among them, 30 are boys. Among the 50 students of another class, 25 are boys. If one from each class is selected.
   a) In how many different ways we can choose a pair of students?
   b) What is the probability of both being girls?
   c) What is the probability of having at least one girl?

13. A man had to travel to a place at a distance of 600km. He travelled half of half of his journey in a specific speed and the next half, a speed 10km/hr more than the first half. Due to the increase in speed he saved one hour in journey time. What is the speed of the car in the first half?

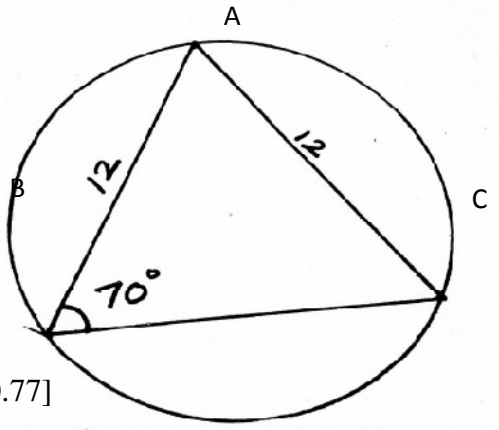
14. The algebraic form of an arithmetic sequence is 4n+2
   a) Write the first term and common difference of the sequence.
   b) Find the sum of first 'n' terms of the sequence
   c) How many consecutive terms from first are needed to get the sum 880?

15. Draw a rectangle with sides 6cm and 4cm. Draw a square equal in area of the rectangle.

16. In the figure,AB=AC=12cm

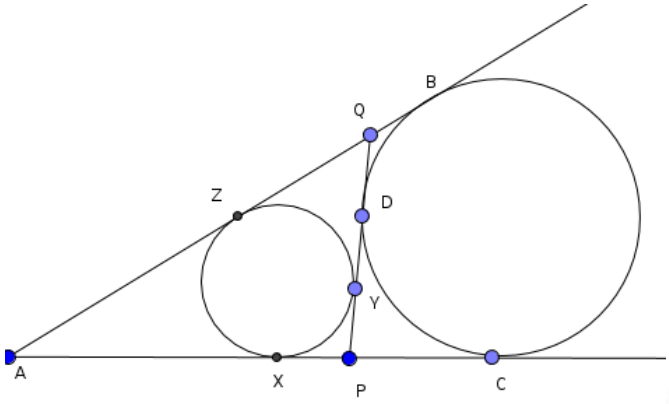
and <ABC =$70^0$

   a) Find the diameter of the circle
   b) What is the length of BC?



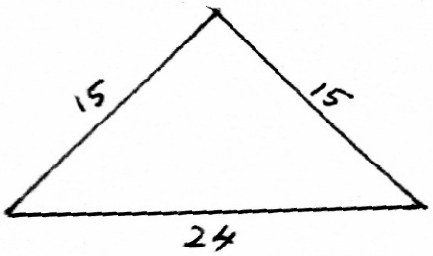

[sin70=0.94 ,cos 70=0.34, sin 40 =0.64, cos 40 =0.77]

17. In figure circle touches the lines at X,Y,Z,B,C, and D. If PQ=8cm,QA=9cm,and PA=7cm.




a) Find the perimeter of triangle APQ
b) Find the length of AC
c) Find the length of PC
d) Find the length of PX,AZ and QY

18. A tent is made in the shape of a square pyramid with lateral face as shown in the figure.




a) What are the measures given here?
b) What is the slant height of the pyramid?
c) What is the lateral surface area?
d) Find the cost of canvas required to make the tent at the rate of ₹ 100 per sq.metre.

19. A line passes through the points (2,-1) and (6,2)
a) Find the slope of the line
b) Write the equation of the line
c) Find the equation of another line parallel to it and passing through the origin.

20. $x^3 - 2x^2 - 5x + 6 = (x - 3)\, q(x) + r$
a) Find q(x) and r
b) Write q(x) as the product of two first degree polynomials.

21. The table below shows the workers in a factory sorted according to their daily wages.

| Daily wages(Rupees) | Number of workers |
|---|---|
| 400-500 | 7 |
| 500-600 | 10 |
| 600-700 | 12 |
| 700-800 | 20 |
| 800-900 | 15 |
| 900-1000 | 8 |
| 1000-1100 | 3 |

a) If wages are written in order, what is the position of the worker with median wage?
b) Find the median wage.

**Answer any five from questions 22 to 28. Each question carries 5 scores (3x2=6)**

22. Consider the arithmetic sequence 7,11,15……
a) Write down the algebraic expression of this sequence
b) Find the remainder , when each term of the sequence is divided by 4
c) What is the reminder , when a perfect square is divided by 4
d) Prove that, this arithmetic sequence does not contain perfect square.

23. Draw a circle of radius 3.5cm. Draw a triangle POR with this circle as circum circle and two of the angles $55^0$ and $60^0$.Construct triangle ABC, outside the circle, by drawing tangents to the circle at the points P,Q,R. Write down the measures of angles of triangle ABC.

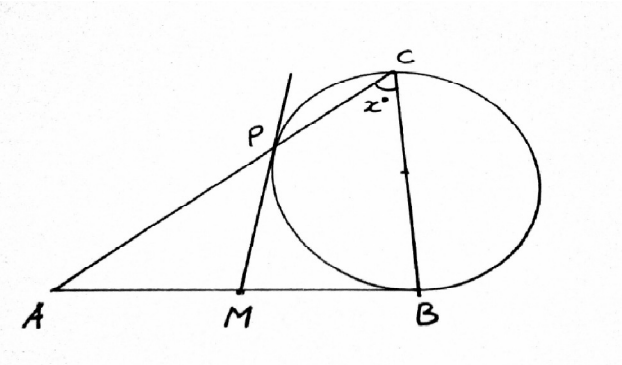
24. $(x-2)^2+ (y+3)^2 = 25$ is the equation of a circle .
   a) Write the co-ordinates of the centre of the circle.
   b) What is the radius of the circle
   c) Is the point (2,2) on the circle? Justify.
   d) Find the co-ordinates of the points at which the circle cuts the Y-axis

25. A pole erected perpendicular to the ground, and two ropes are fastened from the top of the pole to the ground, on either side of the pole. One rope makes an angle $50^0$ with the ground. This rope touches the ground at a distance of 20 m from the foot of the pole. The other rope makes an angle $55^0$ with the ground.
   a) Draw the rough figure
   b) What is the height of the pole?
   c) Find the distance between the two points where the ropes are fixed on the ground.
   d) What is the length of the second rope?

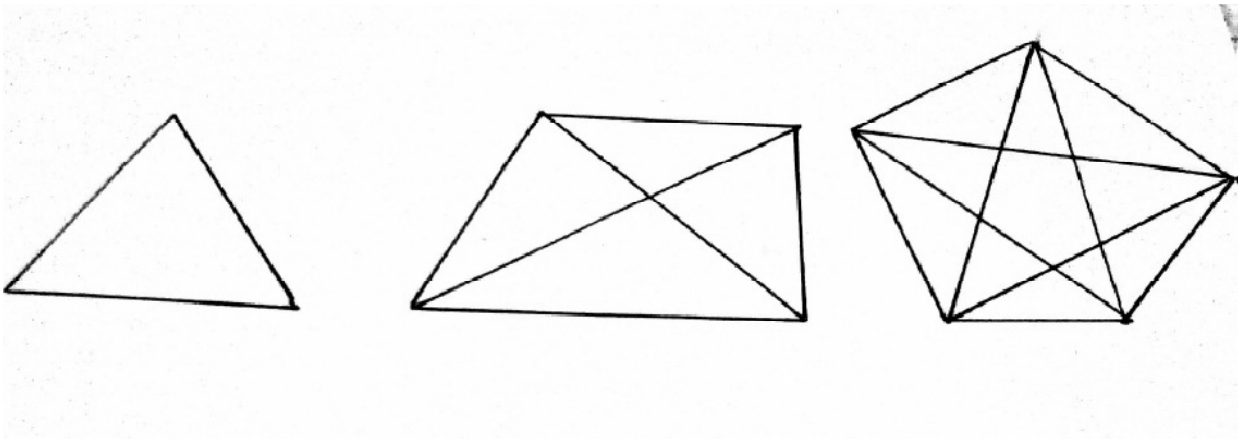
   [sin50=0.77, cos 50= 0.64, tan 50=1.19  sin 55=0.81,cos55=0.57,tan 55=1.43]

26. A sector of radius 30cm and central angle $120^0$ is rolled up to make a cone. AB is a diameter of this cone and C is the apex.
   a) What is the radius of the cone.
   b) Find the perimeter and area of the triangle ABC
   c) Find the volume of the greatest sphere that can be placed inside the cone.
27. Draw the co-ordinate axes and mark the points A(-2,1), B(8,1) ,C(6,4) and D(0,4) .Join the points in order.
   a) Are the sides AB and CD Parallel? Why?
   b) Find the length of AD and BC
   c) Is the quadrilateral ABCD is Cyclic?

28. In the figure, the tangent from A touches the circle at B. BC is a diameter. The line AC cuts the circle at P. The tangent at P cuts AB at M.
   a) What is the measure of $\angle$BPC?
   b) If $\angle C=x^0$, how much is $\angle$BPM ?
   c) Show that $\angle$PAM= $\angle$APM
   d) Show tha , M is the midpoint of AB.



29. In polygons, lines joining the opposite vertices are the diagonals.
A triangle has no diagonal. A quadrilateral has two diagonals and a pentagon has five. The number of diagonals of polygons written in order are 0,2,5…….



a) How many diagonals are there in a hexagon?
b) How many diagonals can be drawn from one vertex of a heptagon?
c) What is the number of diagonals of polygon with '**n**' sides?
d) How many sides are there for a polygon with 35 diagonals?
e) How many more diagonals are there in a polygon with 51 sides than that of a polygon with 50 sides?
f) How many more diagonals are there in a polygon with (n+1) sides than that of a polygon with 'n' sides? (6)