DISTRICT INSTITUTE OF EDUCATION AND TRAINING, PALAKKAD
PRE MODEL EXAMINATION 2022-'23
MATHEMATICS

Standard: X   **Time : $2\frac{1}{2}$ hours**
                                                                                Score : 80
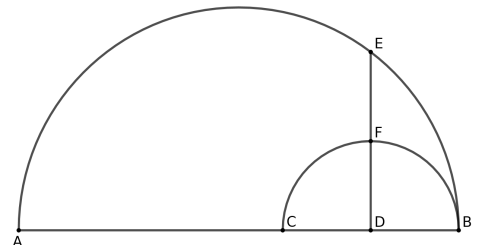
Instructions
- **Read the instructions before answering the questions**
- **Give explanations wherever necessary**
- **First 15 minutes time is cool-off time**

Answer any 3 Questions from 1 to 4 .Each questions carries 2 scores.   (3 x 2 = 6)

1) which number to be subtracted from the second degree polynomial $p(x) = x^2+2x$,to become (x-1) a factor.

2) A(1,3) B(2,5) are 2 points on a line
   a) Find slope of the line
   b) Write coordinates of the midpoint of line AB

3) a) Write an arithmetic sequence whose common difference is 3

   b) What is the difference between the 10th term and the 15th term in this sequence?

4) In the quadrilateral ABCD, $<A = 100^0$, $<B = 90^0$, $<C = 70^0$ then
   a) find <D

   b) If a circle is drawn through the corners A, B and C, where will be the position of D with

respect to the circle?

Answer any 4 Questions from 5 to 10. Each questions carries 3 scores.   (4 x 3 = 12)

5) A man of height $\sqrt{3}$ m sees the top of a tree of height 2 $\sqrt{3}$ m from a certain distance.
   a) What is the angle of elevation in which he sees the top of the tree ?
   b) What is the distance between the man and tree ?

6) A circle is drawn with centre (5,3) .and (5,6) is a point on the circle
   a) What the radius of the circle ?
   b) Write the equation of the circle
   c) Find the distance from the center of the circle to the X-axis

7) A two-digit number whose ones place is 4 and the product of this number and its sum of digits is 70
   a) What is the number if the digit in 10's place is x?
   b) Form the second degree equation and find the number.

8) In figure , AB is the diameter of bigger circle and
   D is the centre of smaller circle.AB = 10cm, DB = 2cm
   a) Find AD x DB
   b) Find DE
   c) Find EF

9)   a) find mean of the first 10 odd numbers

      b) find median also

10) 5th term of an arithmetic series is 30 and 10th term is 55.
    a) find the common difference.
    b) write the sequence
    c) find the 100 th term of the sequence.

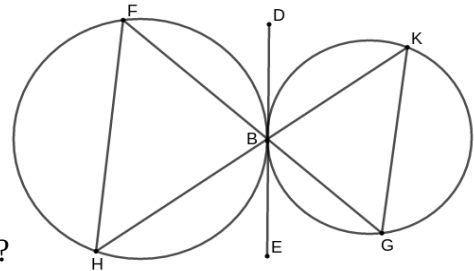**Answer any 8 Questions from 11 to 21. Each questions carries 4 scores.   (8 x 4 = 32)**

11) A box contains 5 red marbles, 8 white marbles and 4 green marbles. If a marble is taken out of this box without looking
       a) What is the probability of getting a red marble?
       b) What is the probability of getting a white marble?
       c) What is the probability of getting not green marble?

12) In figure , DE is a common tangent to the circles.
   $<H = 40^0$, $<F = 35^0$. Find
       a) $<FBD$

       c) $<DBK$

       d) $<G$

       e) Are the two triangles FHB and KGB similar ? Why ?

13) The co ordinates of vertices of a parallelogram ABCD are A(3,2),B(8,4),D(5,7)
       a)Find co ordinates of its fourth vertex
       b)Find length of the sides
       c)Find length of its diagonal AC

14) $p(x) = x^2+x-6$ is a second degree polynomial
       a) write the polynomial as the product of two first degree polynomials.
       b) find the solution of the equation $p(x) = 0$

15) find the following sums
       a) 1+2+3+.....+50
       b) 1+3+5+.....+49
       c) 2+4+6+......+50
       d) 3+7+9+.......+99

16) A sector of central angle 120^0 and radius 12 cm has been rolled up to make a cone
       a) Find the slant height of the cone
       b) Find the base radius of the cone
       c) find the curved surface area of the cone

17) If one side of an equilateral triangle is 9cm
       a) find the perimeter of the triangle
       b) find the radius of its incircle
       c) find the radius its circumcircle

18) The radius of a sphere is 10 cm.
       a) find the Surface area of sphere.
       b) Find the volume of sphere.
       c) What is the surface area of a hemisphere of same radius?
       d) Find the ratio between the surface areas of a sphere and a hemisphere.
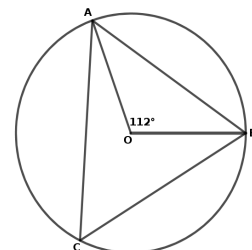
19) A (3,5) ,B (7,9) are two points on a line
       a) Find the slope of the line AB
       b) Write the coordinates of the other 2 points on this line

20)   In figure , $<AOB = 112^0$.What is $<ACB$?
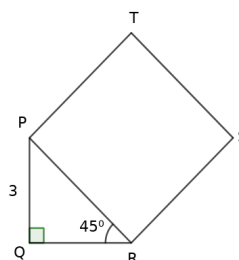   Draw a circle of radius 5cm , and draw a triangle with

    vertices on it and two angles being 43^0 and 54^0

21) In triangle PQR, PQ = 3 cm
       a) Find the length of QR
       b) Find the length of PR
       c) In the square PRST find TR
       d) Find the area of square PRST

Answer any 6 Questions from 22 to 29. Each questions carries 5 scores. **(6 x 5 = 30)**

22) 100,109,118,...
   a) What will be the remainder if the terms of the sequence are divided by 9
   b) Write the series of three-digit number series that are multiples of 9.
   c) Find the position of 999 in this sequence?

23) The angle of elevation of a Jet plane from a point 'A' on the ground is 60^0.After a flight of 15sec the angle of elevation changes to 30^0.If the Jet plane is flying at a constant height of 1500 $\sqrt{3}$ m,
   a) Draw a rough figure.
   b) Find the distance travelled by the plane.
   c) Find the speed of the plane,

24) The side of a cube is 24 cm, from this
   a)Find the height and base of the largest square pyramid that can be carved

   b) Find the volume and surface area of square pyramid

   c) What is the radius of the largest sphere that can be cut from a square of side 24 cm?

25) Draw the co ordinate axes and mark the points
   a)A(-3,1) B(5,1) C(1,5)
   b) Draw Δ ABC by joining the points
   c) Write the co ordinates of any 2 points on the line parallel to the base of Δ ABC
   d) Draw another triangle with area equal to Δ ABC

26) Percentage of female teachers in the different states/ union territories are given below.

% of female teachers	no.of states/UT
15-25	6
25-35	11
35-45	5
45-55	6
55-65	5
65-75	2
75-85	1

   a) In how many states the % of female teachers less than 45?

   b) Find the median class.
   c) Find the median %

27) Draw a triangle of sides 3cm , 5cm , 6cm and draw its incircle.

28)   1
       3 5
       7 9 11
       13 15 17 19

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   a) Write the next two lines of the pattern?
   b) How many numbers are there in the tenth row?
   c) Find the first and last number of the 10th row?
   d) What is the sum of all the numbers in the first 10 rows?

29) In the given square, the area of the white part is 84 square meters and the width of the black rectangle is 8 meters.

   a) What is the width of the white rectangle if the side of the square is x?
   b) What is the length of a side of the square?
   c) What is the probability that if you mark a dot in the image
      without looking, it will be in a black rectangle?