10^{th} CBSE Mathematics Paper - 2022

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1 SECTION-A

1) a) In Fig 1, **AB** is diameter of a circle centred at O. **BC** is the tangent to the circle at B. If **OP** bisects the chord **AD** and $\angle AOP = 60°$, then find m$\angle C$.

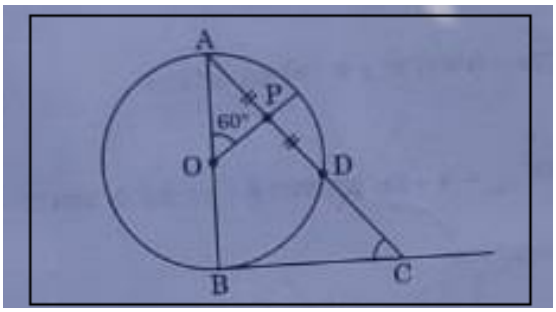

Fig. 1

b) In Fig 2, **XAY** is a tangent to the circle centred at O. If $\angle ABO = 40°$, then find m$\angle BAY$ and m$\angle AOB$.

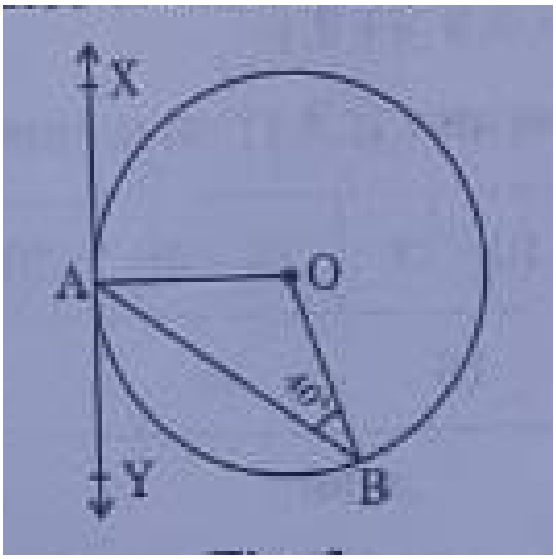

Fig. 2

2) If mode of the following frequency distribution is 55, then find the value of x.

Class :	0-15	15-30	30-45	45-60	60-75	75-90
Frequency :	10	7	x	15	10	12

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3) a) In an A.P, if the sum of third and seventh term is zero, find its 5^{th} term.

OR

b) Determine the A.P. whose third term is 5 and seventh term is 9.

4) Solve the quadratic equation $x^2 + 2\sqrt{2}x - 6 = 0$.

5) Find the sum of the first 20 terms of an A.P. whose n^{th} term is given as a_n = 5-2n

6) A solid piece of metal in the form of a cuboid of dimensions 11 cm x 7 cm x 7 cm is melted to form **n** number of solid spheres of radii $\frac{7}{2}$ cm each. Find the value of **n**.

2 SECTION-B

7) a) The mean of the following frequency distribution is 25. Find the value of f.

Class :	0-10	10-20	20-30	30-40	40-50
Frequency :	5	18	15	f	6

OR

b) Find the mean of the following frequency data using assumed mean methid.

Class :	0-5	5-10	10-15	15-20	20-25
Frequency :	8	7	10	13	12

8) From a point on a bridge across a river, the angles of depression of the banks on opposite sides of the river are $30°$ and $45°$. If the bridge is at a height of 8m from the banks, then find the width of the river.
Refer Fig 3

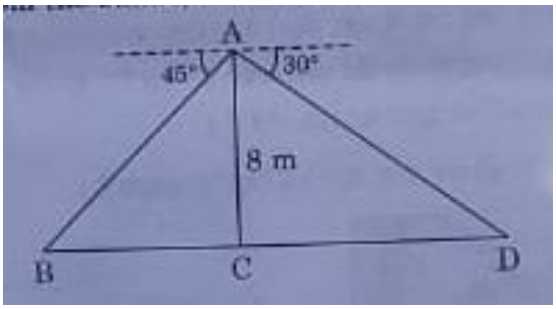

Fig. 3

9) Heights of 50 students of class X of a school are recorded and following data is obtained:

Height (in cm) :	130-135	135-140	140-145	145-150	150-155	155-160
Number of Students:	4	11	12	7	10	6

Find median height of the students.

10) Construct a pair of tangents to a circle of radius 4 cm from a point **P** lying outside the circel at a distance of 6 cm from the centre.

3 SECTION C

11) a) A 2-digit number is such that the product of its digits is 24. if 18 is subtracted from the number, the digits interchange their places. Find the number.

OR

b) The difference of the squares of two numbers is 180. The square of the smaller number is 8 times the greater number. Find the two numbers.

12) Prove that a parallelogram circumscribing a circle is a rhombus.

13) **Case Study-1**:

Kite Festival

Kite festival is celebrated in many countries at different times of the year. In India, every year, 14^{th} January is celebrated as International Kite Day. On this day, many people visit India and participate in the festival by flying various kinds of kite. The picture given below, three kites flying together.

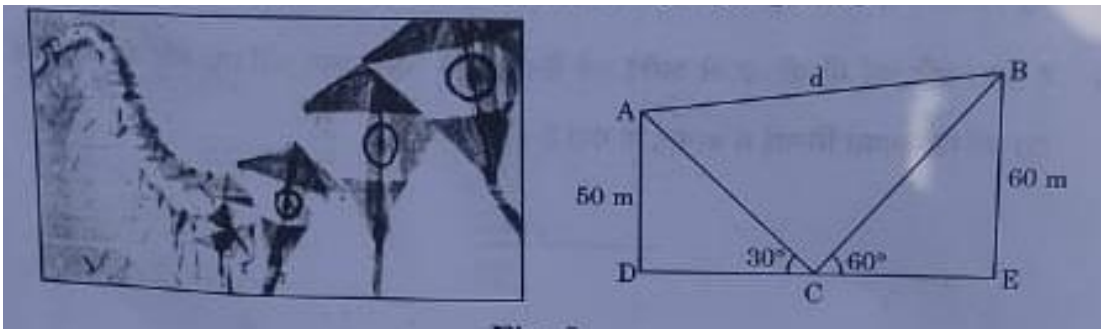

Fig. 4

In Fig 4, the angle of elevation of two kites (Points A and B) from the hands of a man (Point C) are found to be $30°$ and $60°$ respectively. Taking $VecAD$ = 50 m and $VecBE$ = 60 m, find

(1) the lenghts of strings used (take them straight) for kites A and B as shown in the figure.

(2) the distnce 'd' between these two kites.

14) **Case Study-2**:

A circus is a company of performers who put on shows of acrobats, clowns etc to entertain people started around 250 years back, in open fields, now generally performed in tents.

One such circus tent is shown in Fig 5.

The tent is in the shape of a cylinder surmounted by a conical top. If the height and diameter of the cylindrical part are 9 m and 30 m respectively and height of the conical part is 8 m with same diameter as that of the cylindrical part, then find

(1) the area of the canvas used in the tent.
(2) the cost of the canvas bought for the tent at the rate 200 rupees per sq m, if 30 sq m canvas wasted during the stitching.

Fig. 5