PRACTICE PAPER- 5
Mathematics-Basic (241)
CLASS X
Session: 2021-22
TERM II

Time Allowed: 2 hours **Maximum Marks: 40**

General Instructions:

1. The question paper consists of 14 questions divided into 3 sections A, B, C.
2. Section A comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
3. Section B comprises of 4 questions of 3 marks each. Internal choice has been provided in one question.
4. Section C comprises of 4 questions of 4 marks each. An internal choice has been provided in one question. It contains two case study-based questions.

Section A

1. Solve the quadratic equation by factorization: **[2]**

   $ax^2 + (4a^2 - 3b)x - 12ab = 0$

   OR

   Find the roots of the following quadratic equation: $(x + 3)(x - 1) = 3\left(x - \frac{1}{3}\right)$.

2. A hemispherical bowl of internal radius 9 cm is full of liquid. The liquid is to be filled into cylindrical shaped bottles each of radius 1.5 cm and height 4 cm. How many bottles are needed to empty the bowl? **[2]**

3. The mean monthly salary of the 12 employees of a firm is Rs 1450. If one more person joins the firm 8 who gets Rs 1600 per month, what will be the mean monthly salary now? **[2]**

4. Find the 11^{th} term from the last term of the AP 10, 7, 4, ...,-62. **[2]**

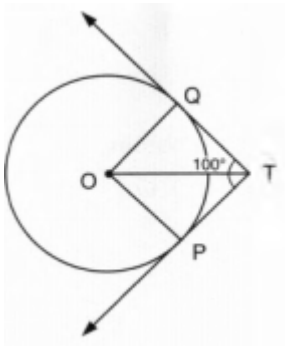
5. Compute the mode from the following series: **[2]**

Size	45 - 55	55 - 65	65 - 75	75 - 85	85 - 95	95 - 105	105 - 115
Frequency	7	12	17	30	32	6	10

6. A circle is touching the side BC of $\triangle ABC$ at P and touching AB and AC produced at Q and R respectively. Prove that AQ = $\frac{1}{2}$(perimeter of $\triangle ABC$). **[2]**

   OR

   Two tangents TP and TQ are drawn from an external point T to a circle with centre O as shown in Figure. If they are inclined to each other at an angle of 100°, then what is the value of $\angle POQ$?



Section B

7. If the sum of a certain number of terms starting from first term of an A.P. is 25, 22, 19,..., is 116. Find the last term. **[3]**

8. If at some time of the day the ratio of the height of a vertically standing pole to the length of its shadow on the ground is $\sqrt{3} : 1$, then find the angle of elevation of the sun at that time. **[3]**

OR

A moving boat observed from the top of a 150 m high cliff, moving away from the cliff. The angle of depression of the boat changes from 60^{o} to 45^{o} in 2 minutes. Find the speed of the boat.

9. Find the length of a tangent drawn to a circle with radius 5 cm, from a point 13 cm from the centre of the circle. **[3]**

10. Find the root of the quadratic equation $4x^2 + 4\sqrt{3}x + 3 = 0$ by applying quadratic formula. **[3]**

Section C

11. Draw a circle of radius 4 cm. Take two points P and Q on one of its extended diameter each at a distance of 6 cm from its centre. Draw tangents to the circle from these two points P and Q. **[4]**

OR

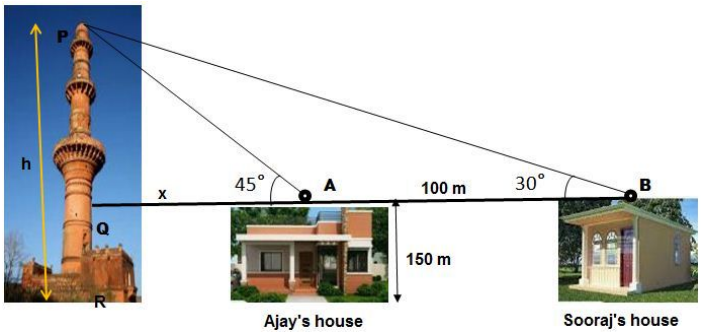
Draw a circle of radius 4 cm. From a point X, 9 cm away from the centre of the circle, draw two tangents to the circle. Also, measure the lengths of the tangents.

12. Find the mean marks of students for the following distribution: **[4]**

Marks	**Number of students**
0 and above	80
10 and above	77
20 and above	72
30 and above	65
40 and above	55
50 and above	43
60 and above	28
70 and above	16
80 and above	10
90 and above	8
100 and above	0

13. The houses of Ajay and Sooraj are at 100 m distance and the height of their houses is the same **[4]**

as approx 150m. One big tower was situated near their house. Once both friends decided to measure the height of the tower. They measure the angle of elevation of the top of the tower from the roof of their houses. The angle of elevation of ajay's house to the tower and sooraj's house to the tower are 45^o and 30^o respectively as shown in the figure.

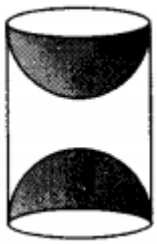


By using the above given information answer the following questions:

i. Find the height of the tower.

ii. What is the distance between the tower and the house of Sooraj?

14. A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in the figure. **[4]**



If the height of the cylinder is 12 cm and its base is of radius 4.2 cm,

i. find the total surface area of the article.

ii. Also, find the volume of the wood left in the article.