

# SAHODAYA PRE BOARD EXAMINATION-2021-22

## CLASS – X

Maximum Marks : 40

Time Allowed: 2 Hours

### General Instructions

1. The question paper consists of 14 questions divided into 3 sections A, B, C.
2. All questions are compulsory.
3. Section A comprises of 6 questions of 2 marks each. Internal choice has been provided in two questions.
4. Section B comprises of 4 questions of 3 marks each. Internal choice has been provided in one question.
5. 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.

### MATHEMATICS - STANDARD (041)

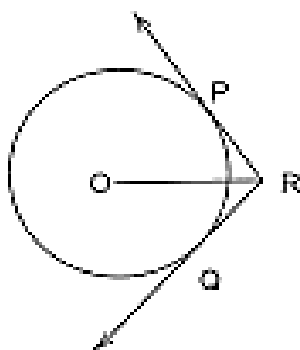
#### SECTION – A

1. Find the 4th term from the end of the AP:  $-11, -8, -5, \dots, 49$ . [2]

OR

If the 2nd term of an AP is 13 and the 5th term is 25, what is its 7th term?

2. If one root of the quadratic equation  $2x^2 - 3x + p = 0$  is 3, find the value of 'p' and also find the other root of the quadratic equation.. [2]
3. In the given figure, two tangents RQ and RP are drawn from an external point R to the circle with centre O. If  $\angle PRQ = 120^\circ$ , then prove that  $OR = PR + RQ$ . [2]



4. Twelve solid spheres of the same size are made by melting a solid metallic cylinder of base diameter 2 cm and height 16 cm. Find the diameter of each sphere. [2]
5. The percentage of marks obtained by 100 students in an examination are given below. Determine the modal percentage of marks. [2]

Marks (in%)	30-35	35-40	40-45	45-50	50-55	55-60	60-65
No. of students	14	16	18	23	18	8	3

6. Find the roots of equation:  $\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}$ ,  $a \neq 0$ ,  $b \neq 0$ ,  $x \neq 0$ . [2]

**OR**

A natural number, when increased by 12, equals 160 times its reciprocal. Find the number.

**SECTION - B**

7. The mean of the following frequency distribution is 50. Find the values of  $f_1$  and  $f_2$ , if sum of all the frequencies is 120. [3]

Class Interval	0-20	20-40	40-60	60-80	80-100
Frequency	17	$f_1$	32	$f_2$	19

8. Construct a pair of tangents to a circle of radius 2 cm from a point on the concentric circle of radius 5 cm and measure its lengths. [3]
9. The annual rainfall record of a city for 66 days is given in the following table. Calculate the median rainfall. [3]

Rainfall (in cm)	0-10	10-20	20-30	30-40	40-50	50-60
Number of days	22	10	8	15	5	6

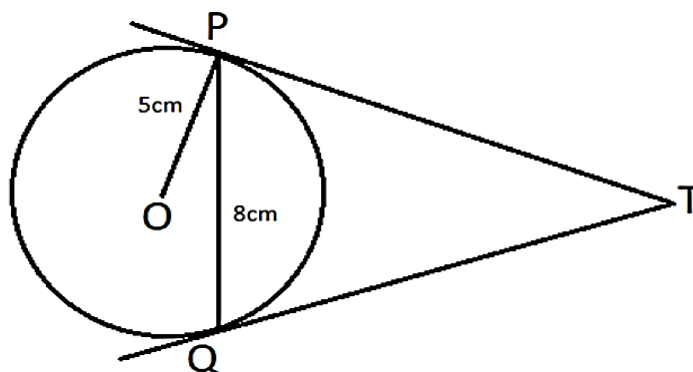
10. The angle of elevation of the top of a tower from a point A on the ground is  $30^\circ$ . On moving a distance of 20 m towards the foot of the tower, in the same straight line to a point B, the angle of elevation increases to  $60^\circ$ . Find the height of the tower and distance of the point A from the foot of the tower. [3]

**OR**

A man standing on the deck of a ship, which is 10m above the water level, observes the angle of elevation of the top of a hill as  $60^\circ$  and the angle of depression of the base of the hill as  $30^\circ$ . Find the distance of the hill from the ship and the height of the hill.

**SECTION - C**

11. A farmer connects a pipe of internal diameter 5mm from a canal into a conical tank in her field, which is 40 cm in diameter and 24cm deep. If water flows through the pipe at the rate of 10m per minute, in how much time will the tank be filled? [4]
12. In the adjoining figure, PQ is a chord of length 8 cm of a circle with centre O. The tangents at P and Q intersect at T. If the radius of the circle is 5 cm, find the length TP. [4]

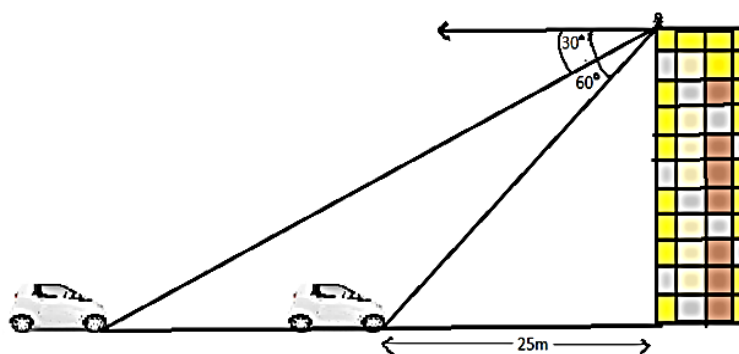


**OR**

Prove that opposite sides of a quadrilateral circumscribing a circle subtend supplementary angles at the centre of the circle.

**CASE STUDY - 1**

13. Rohit is standing at the top of the building observes a car at an angle of depression of  $30^\circ$ , which is approaching the foot of the building with a uniform speed. 6 seconds later, the angle of depression the car is found to be  $60^\circ$ , whose distance at that instant from the building is 25 m.



- (i) Find the distance between the two positions of the car. [2]
- (ii) Find the total time taken by the car to reach the foot of the building from starting point. [2]

### CASE STUDY -2

14. Rita's elder brother wants to buy a car and plans to take loan from a bank for his car. He repays his total loan of Rs 116000 by paying every month starting with his first instalment of Rs 2000. He increases the instalment by Rs 400 every month. Based on the above situation answer the following questions



- (i) How much amount does he still have to pay after the 10<sup>th</sup> instalment ? [2]
- (ii) In how many instalments, he will repay the total loan ? [2]