Navodaya Vidyalaya Samiti

Pre-Board Exams 2021-22

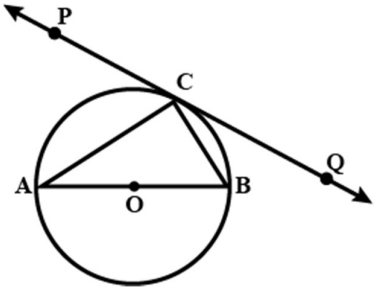
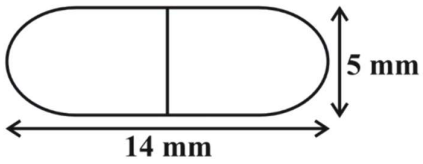
Class – X

Subject – Mathematics Standard (041), TERM-II

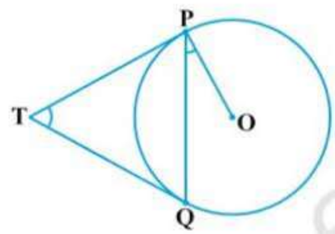
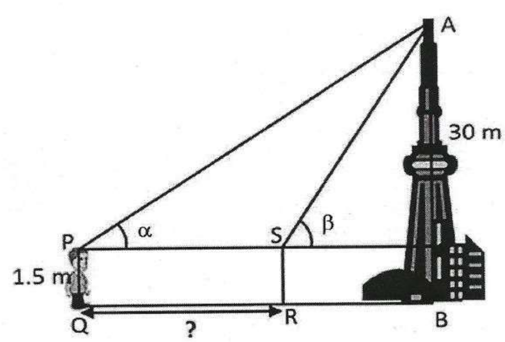
MAXIMUM MARKS: 40 **TIME: 2 Hours**

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. Internal choice has been provided in one question. It contains two case study-based questions.

Q.NO.	SECTION -A	MARKS
1	The sum of n terms of an AP is $3n^2 + 5n$. Find AP. Hence find its 15^{th} term. OR 5 times 5^{th} term of an A. P. is equal to 8 times its 8^{th} term. Show its 13^{th} term is zero.	2
2	For what value of k, the root of quadratic $kx(x - 2\sqrt{5}) + 10 = 0$ are equal?	2
3	In.fig. PQ is tangent at point C to circle with center O, if AB is a diameter and $\angle CAB = 30^0$, Find $\angle PCA$. 	2
4	A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area. 	2

5	Marks obtained by class 10^{th} students is recorded in the given table .The model marks of the students is 36, but one frequency is missing, find the missing frequency. C. I. | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 frequency | 8 | 10 | x | 16 | 12 | 6 | 7	2
6	A chess board contains 64 squares and area of each square is 6.25 cm^2. A border round the board is 2cm wide. Find the length of the side of the chess board. **OR** Solve for x : $4x^2 - 4ax + a^2 - b^2 = 0$	2
	SECTION -B	
7	An aircraft has 120 passenger seats. The number of seats occupied during 90 flight is given in the following table: No. of seats | 100-104 | 104-108 | 108-112 | 112-116 | 116-120 No. of flights | 15 | 20 | 22 | 18 | 15 Determine the mean number of seats occupied over the flight.	3
8	Construct a circle of radius 5cm. Draw two tangents to the circle perpendicular to each other.	3
9	Find the unknown entries a, b, c, d, e and f in the following distribution of height of Students in the class. Height (in cm) | Frequency | Cumulative frequency 150-155 | 12 | a 155-160 | b | 25 160-165 | 10 | c 165-170 | d | 43 170-175 | e | 48 175-180 | 2 | f | 50 |	3
10	A TV tower stands vertically on a bank of a canal. From a point on the other bank directly opposite the tower, the angle of elevation of the top of the tower is 60^0. From another point 20 m away from this point on the line joining this point to the foot of the tower, the angle of elevation of the top of the tower is 30^0. Find the height of the tower and the width of the canal. **OR** An aeroplane when flying at a height of 5000 m from ground passes vertically above another aeroplane at an instance when the angles of elevation of the two planes from the same point on the ground are 60^0 and 45^0 respectively. Find the vertical distance between the aeroplanes at the instance.	3

	SECTION-C	
11	Two tangents TP and TQ are drawn to a circle with centre O from the external point .Prove that ∠PTQ = 2 ∠OPQ. 	4
12	A well of diameter 3 m is dug 14 m deep. The earth taken out of it has been spread evenly all around it in the shape of a circular ring of width 4 m to form an embankment. Find the height of the embankment. **OR** A container, shaped like a right circular cylinder having diameter 12 cm and height 15cm is full of ice cream. The ice cream is to be filled into cones of height 12 cm and diameter 6 cm, having a hemispherical shape on the top. Find the number of such coneswhich can be filled with ice cream.	4
13	**CASE STUDY – I** A Minar is a tower or turret found especially in India. It is the famous monument of tourist attractions including other places near it. Tourists from all over the world come here every year to see the beauty of these Historical monuments. One day a 1.5m tall boy went for an excursion trip. He saw a beautiful Minar and he asked about the height of the Minar from the local guide. The local guide told him that the height of The Minar is 30 m approximately. He is standing at some distance from the Minar and observes the angle of elevation from his eyes to the top of the building increases from α to β as he walks towards it such that Sin (α + β) =1 and Cos (β - α) = √3/2.  i) Find the value of α and β ii) Find the distancehe walked towards the building.	 2 2

14	**CASE STUDY – II** On the occasion of the world environment day 5th June there is plantation in the School campus. All the students with counsel of students and teachers decided to plant trees in and around the school building to reduce air pollution. It was decided that the number of trees, that each section of each class will plant will be double of the class in which they are studying. If there are 1 to 12 classes in the school and each class have 2 sections.  (i) Form an AP representing number of trees planted by each class. **(ii)** Find total number of trees planted by students.	2 2