Pre-Board (Semester 2) 2022

Mathematics (Basic_241)

Class- **X** *Maximum Marks*: **40**

Time Allowed: **2hrs** *No. of pages*: **2**

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

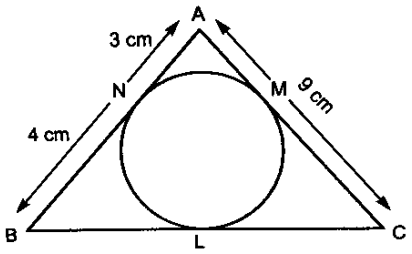
Q1. Find the nature of roots of quadratic equation $2x^2 - \sqrt{5}x + 1 = 0$.

OR

Find the value(s) of *k* for which the given quadratic equation $kx(x - 2) + 6 = 0$ has real and equal roots.

Q2. If three consecutive terms in A.P. are 2y – 1, 2y + 3 and 4y + 3, then evaluate the value of y.

Q3. In the figure, ΔABC is circumscribing a circle where M, L and N are points of contact. If AN =



3cm, NB = 4cm and AC = 9cm, then find the length of BC.

OR

The length of a tangent from a point A at distance 5cm from the centre of the circle, is 4cm. Find the radius of the circle.

Q4. Consider the following frequency distribution:

Class Interval	0 – 5	5 – 10	10 – 15	15 – 20	20 – 25
Frequency	9	16	15	8	12

Find the sum of upper limit of median class and lower limit of modal class.

Q5. Find the unknown values in the following table:

Class Interval	***Frequency***	***Cumulative Frequency***
0 – 10	5	5
10 – 20	7	x_1
20 – 30	x_2	18
30 – 40	5	x_3
40 – 50	x_4	30

Q6. Find the number of solid spheres of diameter 6cm can be made by melting a solid metallic cylinder of height 45cm and diameter 4cm.

SECTION-B

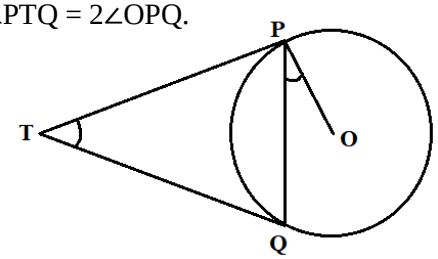
Q7. A 7 m long flagstaff is fixed on the top of a tower standing on the horizontal plane. From point on the ground, the angles of elevation of the top and bottom of the flagstaff are 60° and 45° respectively. Find the height of the tower correct up to one place of decimal. (Use $\sqrt{3}$ = 1.73)

OR

From the top of a 120 m high tower, a man observes two cars on the opposite sides of the tower and in straight line with the base of tower, with angles of depression as 60° and 45°. Find the distance between two cars. (Use $\sqrt{3}$ = 1.73)

Q8. How many terms of the A.P. $-6, -\frac{11}{2}, -5, -\frac{9}{2}$ ….. are needed to give their sum zero.

Q9. In the given figure, two tangents TP and TQ are drawn to circle with centre O from an external point T. Prove that ∠PTQ = 2∠OPQ.



Q10. One side of a rectangle is 14 cm longer than the other. The diagonal is longer than the bigger side by 2cm. Find the dimensions of rectangle.

SECTION-C

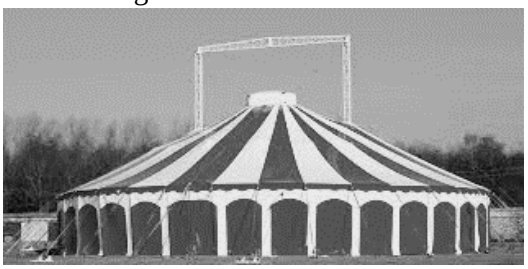
Q11. Construct a pair of tangents PQ and PR to a circle of radius 3.5 cm from a point P outside the circle 8 cm away from the centre. Also, write the steps of construction.

OR

Draw a line segment AB of length 7 cm. Find a point P on it which divides it in the ratio 3 : 5. Also, write the steps of construction.

Q12. A man rowing a boat away from a lighthouse 150 m high takes 2 minutes to change the angle of elevation of the top of lighthouse from 45° to 30°. Find the speed of the boat. (Use $\sqrt{3} = 1.73$)

Q13. The large tent that housed numerous rings and stages became known as the **"The Big Top"**. This name stuck and became interchangeable with circus!



A circus tent is in the shape of a cylinder surmounted by a conical top of the same diameter. If their common diameter is 56m, the height of cylindrical part is 6m and the total height of the tent above the ground is 27m, then

a. Find the slant height of conical part of the tent.
b. Find the area of canvas used in making the tent.

Q14. Examinations are always a cause of anxiety for students. However, with planning and preparation, you can ace your exams with flying colours. Where studying and revising your class lectures on a daily basis are imperative to achieve good grades, you need to create the mind-set of a champion student to excel in your studies**.**

Marks scored by 50 students of class XII A, in a physics paper of 100 marks is noted in the form of a Grouped frequency distribution table.

Marks	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100
No. of students	10	8	12	16	4

a. Calculate the mean marks scored by the students in the physics paper.
b. Also, find the modal marks of frequency distribution table given above.

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