MOCK TEST PAPER

Class – X

Session -2021-22 (TERM-2) **Time Allowed: 120 minutes**

Subject- Mathematics (Standard) **Maximum Marks: 40**

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.

SECTION A

1. Write first four terms of each of the following sequence, whose general terms are:

(i) $a_n = 3n - 7$ (ii) $a_n = (-1)^{n+1} \times 3^n$

OR

What is 18^{th} term of the sequence defined by $a_n = \frac{n(n-3)}{n+4}$?

2. Solve the following quadratic equation for x:

$4x^2 - 4a^2x + (a^4 - b^4) = 0$

3. A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q, so that OQ = 12 cm. Find the length of PQ

4. A copper rod of diameter 1 cm and length 8 cm is drawn into a wire of length 18 m of uniform thickness. Find the thickness of the wire

5. If the mean of the following data is 20.6, find the value of p

X	10	15	p	25	35
f	3	10	25	7	5

6. Find the roots of quadratic equation: $x^2 - 3\sqrt{5}x + 10 = 0$

OR

Two water taps together can fill a tank in 9 hours 36 minutes. The tap of large diameter takes 8 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

SECTION – B

7. The mean of the following frequency distribution is 62.8 and sum of all frequencies is 50. Find the missing frequencies f_1 and f_2.

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	5	f_1	10	f_2	7	8

8. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60°

9. The following data gives the information on the observed life-times (in hours) of 225 electrical components find its mean value.

Life-time (in hours)	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	10	35	52	61	38	29

10. The angle of depression of the top and bottom of a tower as seen from the top of a $60\sqrt{3}$ m high cliff are 45° and 60° respectively. Find the height of the tower

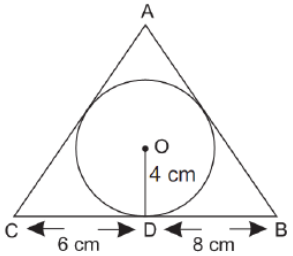
OR

From the top of a tower 50 m high, the angle of depression of the top of a pole is 45° and from the foot of the pole, the angle of elevation of the top of the tower is 60°. Find the height of the pole if the pole and tower stand on the same plane.

SECTION – C

11. A well, whose diameter is 3 m, has been dug 21 m deep and the earth dug out is used to form an embankment 4 m wide around it. Find the height of the embankment.

12. In the given figure, a triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 8 cm and 6 cm respectively. Find the sides AB and AC



OR

If XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B. Prove that ∠AOB = 90°

13. **Case Study – 1**

A group of students of class X visited India Gate on an educational trip. The teacher and students had interest in history as well. The teacher narrated that India Gate, official name Delhi Memorial, originally called All-India War Memorial, monumental sandstone arch in New Delhi, dedicated to the troops of British India who died in wars fought between 1914 and 1919. The teacher also said that India Gate, which is located at the eastern end of the Rajpath (formerly called the Kingsway), is about 138 feet (42 metres) in height.

(i) What is the angle of elevation if they are standing at a distance of 42 m away from the monument?

(A) 30° (B) 45° (C) 60° (D) 0°

(ii) They want to see the tower at an angle of 60°. The distance where they should stand will be

(A) 25.24 m (B) 20.12 m (C) 42 m (D) 24.25 m

14. Case Study – 2

Your friend Veer wants to participate in a 200 m race. Presently, he can run 200 m in 51 seconds and during each day practice it takes him 2 seconds less. He wants to do in 31 seconds.

(i) Which of the following terms are in AP for the given situation?

(A) 51, 53, 55, ... (B) 51, 49, 47, ... (C) –51, –53, –55, ... (D) 51, 55, 59, …

(ii) If n^{th} term of an AP is given by $a_n = 2n + 3$ then common difference of an AP is

(A) 2 (B) 3 (C) 5 (D) 1