Sample Question Paper -2022
Mathematics- Standard (041)
Class- X, Session: 2021-22
TERM II- S01

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. 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 4questions 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.

1.	For what value of r, the rth term of the sequences 3, 10, 17, ... and 63, 65, 67, ... are equal? OR Find the first term and common difference of an AP whose 6th term is 12 and 8th term is 22.	2
2.	AB and CD are two common tangents to circles which touch each other at C. IF D lies on AB such that CD = 5 cm. What is the length of AB? 	2
3.	Using the quadratic formula, solve the equation: $a^2b^2 x^2 - (4b^4 - 3 a^4)x - 12a^2b^2 = 0$.	2
4.	A metal cube of edge 12 cm is melted and formed into three smaller cubes. If the edges of the two smaller cubes are 6 cm and 8 cm, find the edge of the third smaller cube. (Marks : 1)	2
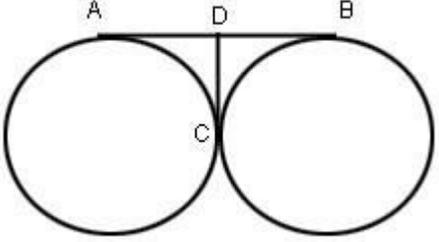
5.	For the following grouped frequency distribution, find the mode:	2

Class	3 - 6	6 - 9	9 - 12	12 - 15	15 - 18	18 - 21	21 - 24
Frequency	2	5	10	23	21	12	3

6.	Find the value of k in the given polynomial such that 3 becomes the zero of the polynomial p(x) = $2x^2$ - $3kx$ + 2. OR Find if x = $\dfrac{5}{6}$ is a solution of quadratic equation $x + \dfrac{1}{x} = \dfrac{13}{6}$	2

	SECTION- B	

7.	In a study of patients, the following data were obtained. Find the median.	3

Age (in years)	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89
Number of cases	1	0	1	10	17	38	9	3

8.	A pole 5 m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point A on the ground is 60° and the angle of depression of the point A from the top of the tower is 45°. Find the height of the tower. OR A man on the top of a vertical observation tower observes a car moving at a uniform speed coming directly towards it. If it takes 12 minutes for the angle of depression to change from 30° to 45°, how soon after this will the car reach the observation tower?	3
9.	Let ABC be triangle in which AB = 6 cm, BC = 4 cm, AC = 4 cm. The circle through B and C is drawn. Construct the tangents from A to the circle.	3
10.	The mean of the following data is 266.25. Find the missing frequencies f_1 and f_2.	3

Classes	100 - 150	150 - 200	200 - 250	250 - 300	300 - 350	350 - 400	400 - 450	450 - 500	Total
Frequencies	24	40	33	f_1	30	f_2	16	7	200

	SECTION- C	

11.	The diameters of the internal and the external surfaces of a hollow spherical shell are 6 cm and 10 cm respectively. It is melted and recast into a solid cylinder of height 8 cm. Find the radius of the cylinder.	4
12.	From point P, two tangents PA and PB are drawn to a circle with centre O. If OP is the diameter of the circle, show that $\triangle$ APB is equilateral	4
13.	**CASE STUDY-1** An aeroplane falls vertically due to some mechanical problems and makes angles of elevation of 60° and 30° at an observing point. If the distance between the two points A and B is 1000m . (a) Find the height at which the aeroplane faces the mechanical problems.	4

(b) find the distance between at which the aeroplane falls and the point o f observation

$\left(\text{Take } \sqrt{3} = 1.73\right)$.

A

1000 m

B

60

30

O

C

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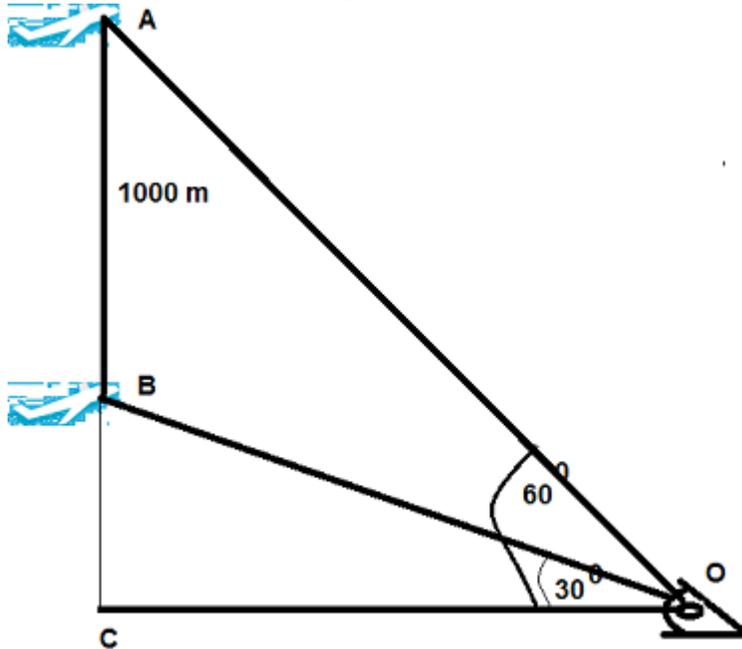
14. | **CASE STUDY-2**

A spiral is made up of successive semi-circles, with centres alternately at A and B, starting with centre at A, of radii 0.3 cm, 0.6 cm, 0.9 cm, 1.2 cm, ... as show in figure below.

    (a) What is the radius of such spiral a at it 34th semi-circles?

    (b) What is the total length of such spiral made up of 24 consecutive semi-circles?

(Take $\pi = \dfrac{22}{7}$)

| 4

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ℓ_3

ℓ_1

A   B

ℓ_2

ℓ_4