Modern Middle East International School

Academic Year 2021 – 2022

PREBOARD EXAMINATION -3

Name:	**Subject: Mathematics - STANDARD**	**Date: 10-4-2022**
Class: 10	**Set: A**	**Duration: 2 hours**
Section:	**Max. Marks: 40**	**Marks Obtained:**

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.

SECTION-A **[6 x 2 = 12M]**

1) Find k so that the quadratic equation $(k+1)x^2 - 2(k+1)x + 1 = 0$ has equal roots.

2) Find the nature of the roots of the quadratic equation $3x^2 - 4\sqrt{3}x + 4 = 0$ and hence solve it.

(OR)

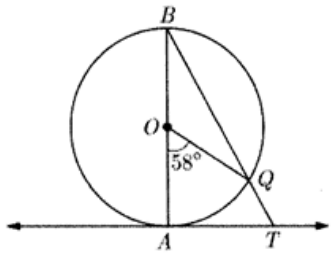
A two digit number is four times the sum of the digits. It is also equal to 3 times the product of the digits. Find the number.

3) Find the middle term of the A.P 213, 205, 197, ...37.

(OR)

Find the number of natural numbers between 102 and 998 which are divisible by 2 and 5 both.

4) In the given figure, AB is the diameter of a circle with center O and AT is the tangent. If $\angle AOQ = 58°$, find $\angle ATQ$.



5) A solid metallic sphere of radius 10.5 cm is melted and recast into a number of smaller cones, each of radius 3.5cm and height 3cm.Find the number of cones so formed.

6) The following table shows the cumulative frequency distribution of marks of 80 students in an examination:

Marks	Number of students
Below 10	1
Below 20	5
Below 30	13
Below 40	27
Below 50	44
Below 60	57
Below 70	67
Below 80	74
Below 90	78
Below 100	80

Construct a frequency distribution table for the data above.

SECTION-B **[3 x 4 = 12M]**

7) The maximum bowling speeds, in km per hour, of 33 players at a cricket coaching center are given as follows :

Speed (km/h)	85-100	100-115	115-130	130-145
Number of players	11	9	8	5

Calculate the median bowling speed.

8) The daily income of a sample of 50 employees are tabulated as follows:

Income (in Rs)	1-200	201-400	401-600	601-800
Number of employees	14	15	14	7

Find the mean daily income of employees.

9) Draw a circle of radius 4 cm. Construct a pair of tangents to it, the angle between which is 60º. Also justify the construction. Measure the distance between the center of the circle and the point of intersection of tangents.

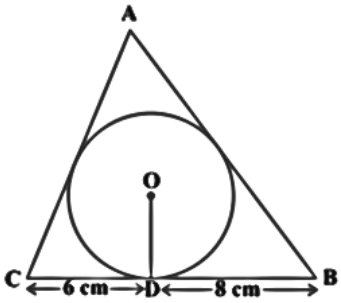
10) Amit, standing on a horizontal plane, finds a bird flying at a distance of 200 m from him at an elevation of 30°. Deepak standing on the roof of a 50 m high building, finds the angle of elevation of the same bird to be 45°. Amit and Deepak are on opposite sides of the bird. Find the distance of the bird from Deepak.

(OR)

The shadow of a tower standing on a level plane is found to be 50 m longer when Sun's elevation is 30° than when it is 60°. Find the height of the tower.

SECTION-C **[4 x 4 = 16M]**

11) 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 as shown in the figure given below. Find the sides AB and AC.



12) A man rowing a boat away from a lighthouse 100 m high takes 2 minutes to change the angle of elevation of the top of lighthouse from 60° to 30°.Find the speed of the boat in metres per min.[Use $\sqrt{3} = 1.732$]

Case Study-1

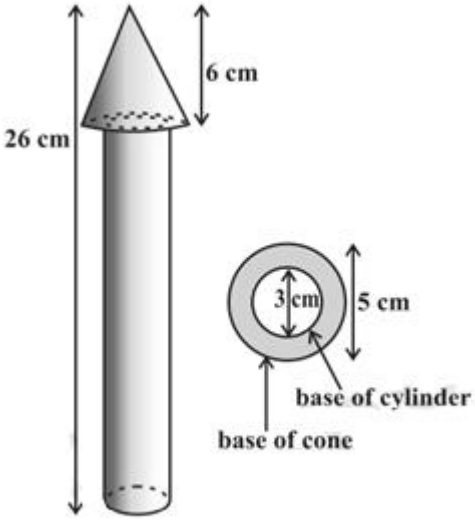
13) 200 logs are stacked in the following manner: 20 logs in the bottom row, 19 in the next row, 18 in the row next to it and so on as shown in the figure.

i) In how many rows are the 200 logs placed.

ii) How many logs are in the top row?

Case Study-2

14). A wooden toy rocket is in the shape of a cone mounted on a cylinder, as shown in the figure. The height of the entire rocket is 26 cm, while the height of the conical part is 6cm. The base of the conical portion has a diameter of 5cm, while the base diameter of the cylindrical portion is 3cm. The conical portion is to be painted orange and the cylindrical portion yellow (Take $\pi = 3.14$)



i) Find the area of the rocket to be painted orange color.

ii). Find the area of the rocket to be painted yellow color.

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