



# Modern Middle East International School

Academic Year 2021 – 2022

## PREBOARD EXAMINATION -3

<b>Name:</b>	<b>Subject: Mathematics -BASIC</b>	<b>Date: 10-4-2022</b>
<b>Class: 10</b>	<b>Set: A</b>	<b>Duration: 2 hours</b>
<b>Section:</b>	<b>Max. Marks: 40</b>	<b>Marks Obtained:</b>

### 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

[6 x 2 = 12M]

- 1) If the roots of quadratic equation  $2x^2 - 8x + k = 0$  are real and equal, then find the value of k.

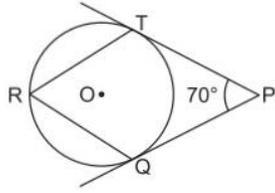
(OR)

Find the roots of the quadratic equation  $3x^2 - 4\sqrt{3}x + 4 = 0$ .

- 2) A solid metallic cuboid of dimension 24 cm × 11 cm × 7 cm is melted and recast into solid cones of base radius 3.5 cm and height 6 cm. Find the number of cones so formed.
- 3) Find the sum of the lower limit of median class and the upper limit of the modal class.

Classes	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	1	3	5	9	7	3

- 4) How many two-digit numbers are divisible by 7?
- 5) The median and mode respectively of a frequency distribution are 26 and 29, then find its mean.
- 6) In the figure given below, O is the centre of a circle PT and PQ are tangents to the circle from an external point P. If  $\angle TPQ = 70^\circ$  find  $\angle TRQ$ .



(OR)

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 = 13 cm. Find the length of PQ.

### SECTION-B

[ 3 x 4 = 12M ]

- 7) The 10th term of an AP is 29 and the sum of its first 20 terms is 610. Find the sum of its first 30 terms.
- 8) The angle of elevation of the top of a chimney from the foot of a tower is  $60^\circ$  and the angle of depression of the foot of the chimney from the top of the tower is  $30^\circ$ . If the height of the tower is 40 meters, find the height of the chimney.

(OR)

As observed from the top of a 75m high light house above the sea level, the angles of depression of two ships are  $30^\circ$  and  $45^\circ$  respectively. If one ship is exactly behind the other on the same side of the light house and in the same straight line, find the distance between the two ships.

(use  $\sqrt{3} = 1.732$ ).

- 9) Prove that the lengths of two tangents drawn from an external point to a circle are equal.
- 10) Is the following situation possible? If so, determine their present ages. "The sum of the ages of two friends is 20 years. Four years ago, the product of their ages in years was 48".

### SECTION-C

[4 x 4 = 16M ]

- 11) Draw a line segment of length 7.6 cm and divide it in the ratio 5:8. Measure the two parts. Write the steps of constructions and give the proper justification also.

(OR)

Draw a circle of radius 4 cm. Construct a pair of tangents to it, the angle between which is  $60^\circ$ .

- 12) On the annual day of school, age-wise participation of students is given in the following distribution table:

Age (in years)	Number of students
Less than 6	2
Less than 8	6
Less than 10	12
Less than 12	22
Less than 14	42
Less than 16	67
Less than 18	76

Find the median age of the students.

### **Case Study-1**

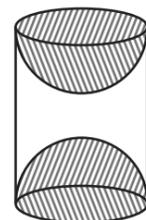
13) A group of students of class X visited India Gate on an educational trip. The teacher and students had interest in history as well. The teacher narrated that India Gate, official name Delhi Memorial, originally called All-India War Memorial, monumental sandstone arch in New Delhi, dedicated to the 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, is about 42 m in height.



- i) What is the angle of elevation if the students are standing at a distance of 42 m away from the monument?
- ii) The students want to see the top of the monument at an angle of  $60^\circ$ . At what distance they should stand from the monument?

### **Case Study-2**

14) A wooden article was made by scooping out a hemisphere from each end of a solid cylinder, as shown in the figure. If the height of the cylinder is 10 cm, and its base is of radius 3.5 cm.



i). Find the total surface area of the article.

ii). Find the volume of the wooden article. Also, find the weight if  $1\text{cm}^3$  of wood weighs 1.5gm.

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