

Mock Board Exam

STD: X
Maximum marks : 40

SUBJECT: Mathematics
17/3/2022 11:00 - 17/3/2022
22:30

ASSESSMENT: Mock Test
Time Limit : 90 Minutes

Attempt all questions from Section A and any three questions from Section B.

A student has to answer a question either by typing it out, in the space provided, or writing down each answer on paper, and uploading a picture of it using the upload option.

A student is advised to write the answers in a clear, legible handwriting using a blue/black ball point pen before uploading it.

Section A

10 Marks

(Attempt all questions.)

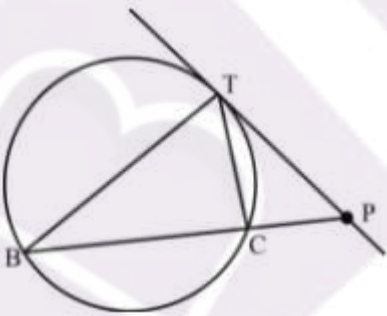
Do not copy the question, Write the correct answer only. Select the correct answer for the MCQ questions.

10 Marks

Choose the correct answers to the questions from the given options.

(Do not copy the question, Write the correct answer only.)

- 1 In the above given figure, $PB = 9$ cm, $CP = 4$ cm and TP is a tangent at T . Find PT . **1 M**



- (A) 6 cm (B) 9 cm (C) 8 cm (D) 2 cm
- 2 Perpendicular from the centre of the circle to the chord bisects the chord in what ratio? **1 M**
- (A) 1 : 1 (B) 1 : 2 (C) 2 : 1 (D) 1 : 4
- 3 The ratio of volume to the total surface area of a solid sphere is 8. Find its radius. **1 M**
- (A) 6 cm (B) 12 cm (C) 24 cm (D) 48 cm

- 4 If a tower 30 m high, casts a shadow 103 m long on the ground, then what is the angle of elevation of the sun? **1 M**

(A) 30° (B) 45°

(C) 60° (D) 90°

- 5 Find the value of $4(1 - \sin^2 \theta)(1 + \tan^2 \theta)$ **1 M**

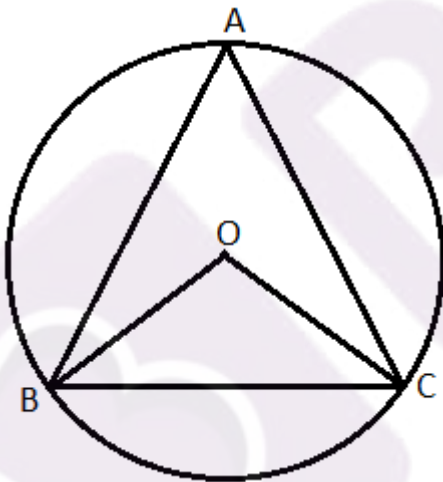
(A) 4 (B) 1

(C) 2 (D) 0

- 6 If the cumulative frequency at a particular class interval 30 – 35 is 19 and the cumulative frequency at the next class -interval i.e 35 – 40 is 27 , the frequency at 35 – 40 is _____. **1 M**

(A) 18 (B) 8 (C) 10 (D) 3

- 7 In the below given figure, an equilateral triangle ABC is inscribed in a circle centered at O . Then find the measure of $\angle BOC$. **1 M**



(A) 60° (B) 90° (C) 110° (D) 120°

- 8 Find the volume of a cone whose height and radius is 6 cm and 5 cm respectively **1 M**

(A) $50 \pi \text{ cm}^3$ (B) $45 \pi \text{ cm}^3$ (C) $55 \pi \text{ cm}^3$ (D) $40 \pi \text{ cm}^3$

- 9 The following data gives the information on the observed lifetime (in hours) of 225 electrical components: 1 M

Lifetime (in hours)	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120
No. of Components	10	35	52	61	38	29

Determine the modal class lifetimes of the components.

- (A) 20 – 40 (B) 40 – 60 (C) 60 – 80 (D) 80 – 100
- 10 A card is drawn at random from a pack of 52 cards. Find the probability that the card drawn is a king. 1 M
- (A) $\frac{1}{2}$ (B) $\frac{1}{13}$ (C) $\frac{15}{26}$ (D) $\frac{8}{13}$

Section B

30 Marks

(Attempt **any three Groups** from this Section B.)

Group I

10 Marks

- 11 A conical tent is built such that it can accommodate 25 people. If each person, on an average occupies an area of 4 m^2 of ground, and the height of the conical tent is 18 m, then find the volume of the tent 2 M
- 12 Find the probability of getting 53 Fridays in a leap year. 2 M
- 13 In the given figure, $\angle A = 60^\circ$ and $\angle ABC = 80^\circ$, then find $\angle DPC$ and $\angle BQC$. 3 M

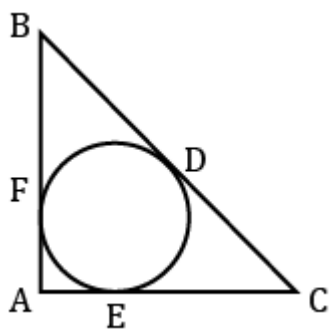


- 14 A 1.2 m tall girl spots a balloon moving with the wind in a horizontal line at a height of 88.2 m from the ground. The angle of elevation of the balloon from the eyes of the girl at any instant is 60° . After some time, the angle of elevation reduces to 30° . Find the distance traveled by the balloon during the interval. 3 M

Group II

10 Marks

- 15 In the given diagram, a circle is inscribed in a right angled triangle such that $AF = 6 \text{ cm}$ and $EC = 15 \text{ cm}$. Find the difference between CD and BD . **2 M**



- 16 How many cylindrical containers of $r = 0.5 \text{ cm}$ and $h = 7 \text{ cm}$ are required to completely fill a cylindrical container of radius 5 cm and height 14 cm ? **2 M**

- 17 Prove that $(\sin \theta + \operatorname{cosec} \theta)^2 + (\cos \theta + \sec \theta)^2 = 7 + \tan^2 \theta + \cot^2 \theta$ **3 M**

- 18 The table shows the Distribution of the Scores obtained by 155 shooters in a shooting competition. Use a graph sheet to draw an ogive for the distribution. Estimate the number of shooters who obtained a score of more than 85%. **3 M**

Score	No.of Shooters
0-10	10
10-20	12
20-30	15
30-40	8
40-50	20
50-60	24
60-70	7
70-80	11
80-90	30
90-100	18

Group III

10 Marks

- 19 If $A = a \cos \alpha \cdot \cos \beta \cdot \cos \theta$, $B = a \cos \alpha \cdot \cos \beta \cdot \sin \theta$, $C = a \sin \alpha \cdot \cos \beta$ and $D = a \sin \beta$, then find the value of $A^2 + B^2 + C^2 + D^2$. **2 M**

- 20 The age of the employees in a startup company is shown below. Find the average age of the employees. **2 M**

Age	18-26	26-34	34-42	42-50	50-58	58-66
No.of Employees	30	70	50	30	10	10

- 21 The radius of a solid circular cylinder decreases by 20% and its height increases by 10%. Find the percentage change in its: **3 M**
- (a) volume
- (b) curved surface area

- 22 Draw a circle of diameter of 9 cm. Mark a point at a distance of 7 cm from the centre of the circle. Draw tangents to the given circle from this exterior point. **3 M**

Group IV

10 Marks

- 23 The centres of two circles of radii 3 cm and 2 cm are 8 cm apart. Find the length of the common tangent. **2 M**
- 24 If $3 \sin \theta + 4 \cos \theta = 5$, then the value of find the value of $\sin \theta$. **2 M**
- 25 The probability of selecting a white ball at random from a container that contains only white, yellow and red balls is $\frac{1}{7}$. The probability of selecting a yellow ball at random from the same container is $\frac{1}{5}$. If the container contains 23 red balls, find the total number of balls in the container. **3 M**

- 26 The marks obtained by the students of a class, in an exam which was out of 50 marks, is given below.

3 M

Marks	No. of students
5	1
7	2
11	2
16	3
21	5
24	6
28	3
32	5
34	8
39	6
43	4
5	1
7	2
45	2
49	3

Represent the same as grouped data, with class intervals of width = 10 and find the mode for the grouped data.

Group V

10 Marks

- 27 Given a dartboard of radius 50 cm, find the probability of hitting the bull's eye of radius 5 cm. **2 M**
- 28 A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in his field that is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 3 km/hr, in how much time will the tank be filled? **2 M**
- 29 The angle of elevation of a cloud from a point h metres above a lake is α and the angle of depression of its reflection in the lake is β . Then find the height of the cloud in terms of trigonometric ratios. **3 M**
- 30 Using the frequency distribution table given below, draw 'less than ogive'. Then from the ogive, find the interquartile range. **3 M**

Class Interval	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60
Frequency	2	4	6	8	10