MANECKJI COOPER EDUCATION TRUST SCHOOL,
JUHU TARA ROAD, MUMBAI 400 049

PRELIMINARY EXAMINATION – SEMESTER 2

STD - X **DATE- 24/02/ 2022**

SUBJECT- MATHEMATICS **MARKS- 40**

TIME- One and a half hour

Answers to this Paper must be written on the paper provided separately.

*You will **not** be allowed to write during the first 10 minutes.*

This time is to be spent in reading the Question Paper.

The time given at the head of this paper is the time allowed for writing the answers.

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

The intended marks for questions or parts of questions are given in brackets [ ].

SECTION A

*(Attempt **all** questions from this section)*

Question 1

Choose the correct answers to the questions from the given options. (Do not copy the questions, Write the correct answers only.) [10]

(i) The point P (a, b) is reflected in the x-axis to P' (2,-5). The co-ordinate of P is

(a) (2,5)

(b) (-2,5)

(c) (-2,-5)

(d) None of the above

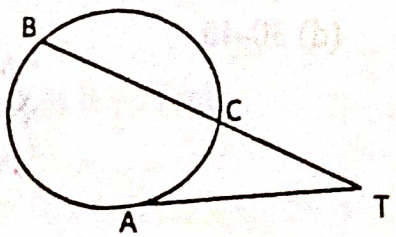
(ii) In the given figure AT is the tangent to the circle. Find AT if BC = 12cm and CT = 4cm.

(a) 6 cm

(b) 8 cm

(c) 10 cm

(d) 12 cm



(iii) A rectangular paper is folded into a cylinder. The length and breadth of the paper are L and B respectively. Which of the following represents its curved surface area?

(a) $2\pi LB$

(b) LB

(c) $\frac{L}{B}$

(d) πLB

(iv) If P (-1, 1) is the mid-point of the line segment joining A (-3,b) and B (1, b+4), then the value of b is :

(a) 1

(b) -1

(c) 2

(d) 0

(v) If tan A = cot B, then:

(a) $A - B = 90°$

(b) $A = B = 90°$

(c) $A + B = 90°$

(d) $B - A = 90°$

(vi)

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequency	8	15	12	20	9

The median class of the following data is:

(a) 0- 10

(b) 10-20

(c) 20-30

(vii) The line $4x - 3y + 12 = 0$ meets x-axis at A. The co-ordinate of A is:

(a) (-3,0)

(b) (3,0)

(c) (0,3)

(d) (3,3)

(viii) The radius and the height of a cone are 6cm and 8cm respectively. The curved surface area is: ($\pi = 3.14$)

(a) 184.8 cm^2

(b) 148.8 cm^2

(c) 188.4 cm^2

(d) 144.8 cm^2

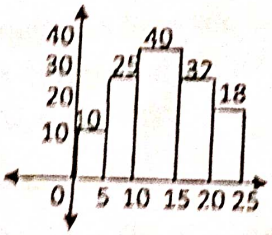
(ix) In the given histogram the modal class is:

(a) 0-5

(b) 5-10

(c) 10-15

(d) 15-20



(x) The probability of getting a multiple of 2 in a throw an unbiased die is:

(a) 1

(b) $\frac{1}{3}$

(c) $\frac{1}{2}$

(d) $\frac{2}{3}$

SECTION B

(Attempt any three questions from this section)

Question 2

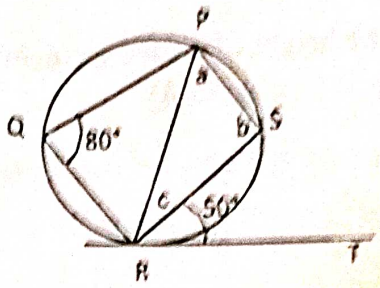
(i) The slope of a line joining P (12,k) and Q (1 - 3k, 3) is $\frac{1}{2}$. Find: [2]

(a) The value of 'k',

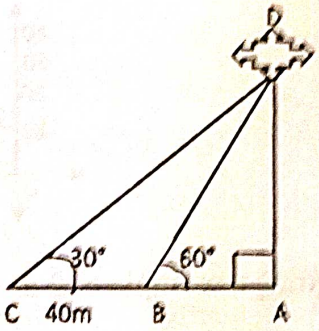
(b) Mid-point of PQ, using the value of 'k' found in question (a).

(ii) From a set of 17 cards numbered 1, 2, 3, ...17, one card is drawn at random. What is the probability that the number on the drawn card is a multiple of 3 or 7. [2]

(iii) PQRS is a cyclic quadrilateral. RT is a tangent, $\angle PQR = 80°$ and $\angle SRT = 50°$. Find the value of a, b and c. [3]

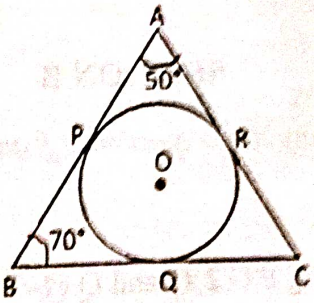


(iv) On a levelled plane, the shadow of the standing tower is found to be 40m longer when the sun's altitude is 30°, than when it is at 60°. Find the height of the tower. [3]



Question 3

(i) A circle with centre O is inscribed in a triangle ABC, where $\angle A = 50°$, $\angle B = 70°$. If the circle touches the sides of the triangle at P, Q and R, find $\angle POQ$ and $\angle QOR$. [2]



(ii) From a solid cylinder of height 24 cm and radius 7 cm, a conical cavity of same radius and height are made. Calculate the volume of the remaining solid. [2]

(iii) Prove that: $\frac{\cot A - 1}{2 - \sec^2 A} = \frac{\cot A}{1 + \tan A}$ [3]

(iv) [3]

C.I	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80
f	5	10	20	25	15	12	9	4

Draw the ogive and find the median.

Question 4

(i) Find the equation of a line passing through the point (4, -6) and having x- intercept 8 units. [2]

(ii) Find the mean of the following distribution. [2]

C.I	35-40	40-45	45-50	50-55	55-60
f	7	6	9	5	3

(iii) A conical vessel whose internal radius is 5cm and height 24cm is full of water. The water is emptied into a cylindrical vessel with internal radius 10cm. Find the height to which the water rises. [3]

(iv) Use a graph paper for this question.

Triangle OA_1B_1 is a reflection of triangle OAB in the origin, where $A_1(4, -5)$ is the image of A and $B_1(-7,0)$ is the image of B. [3]

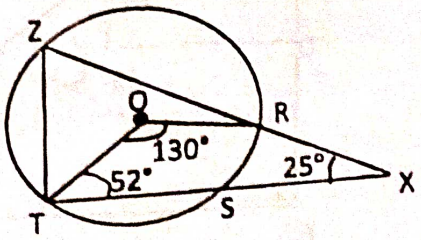
(a) Write the co-ordinates of A and B.

(b) Plot and join the points A, B and O.

Question 5

(i) TS and ZR are two chords of a circle with the centre O, intersecting each other in X when produced. $\angle TOR = 130°, \angle RXT = 25° \text{ and } \angle XTO = 52°$. [2]

Calculate $\angle ZTO$:



[2]

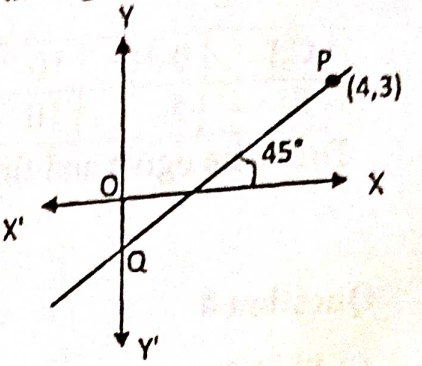
(ii) Prove that: $\frac{sinA-2sin^3A}{2cos^3A-cosA} = tanA$

(iii) The line PQ intersects the y-axis as shown in the figure given below. [3]

(a) Write the slope of the line.

(b) Write the equation of the line.

(c) Find the co-ordinates of Q.



(iv) Use graph paper for this question. Estimate the mode of the given distribution by plotting a histogram. [3]

Marks	10-20	20-30	30-40	40-50	50-60
No. of students	12	35	45	25	13

Question 6

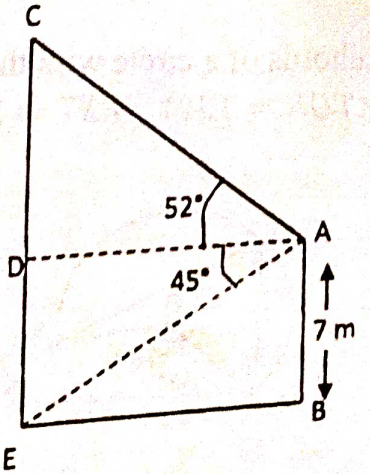
(i) Two dice are thrown simultaneously. Find the probability of obtaining [2]

(a) The sum of two numbers that turn up is 8

(b) The same number on both the dice.

(ii) Find the co-ordinates of the centroid A (-1,3), B (1,-1) and C (5,1). [2]

(iii) There is a building of height 7m next to the cable tower of unknown height. From the top of the building, the angle of elevation of the top of the tower is 52° and the angle of depression to the foot of the tower is 45°. Find the height of the tower to the nearest meter. [3]



(iv) Find the value of the unknown frequency if the mean of the following distribution is 54. [3]

C.I	0-20	20-40	40-60	60-80	80-100
Frequency	7	p	10	9	13