Room 2 - (2)

SRI SRI RAVISHANKAR VIDYA MANDIR, MULUND
FIRST PRELIMINARY EXAMINATION (2021-2022)
SUBJECT: MATHEMATICS

STD: X
TIME: $1\frac{1}{2}$ hour

DATE: 07/02/2022
MARKS:40

Answers to each question must be written on a separate sheet of paper. You will not be allowed to write during the first 10 minutes.
This time is to be spent reading the Question paper.
The time given at the head of the paper is the time allotted for writing the answers.
Attempt all the questions from Section A and any three questions from Section B.
All working including rough work must be clearly shown and must be done on the same sheet as the rest of the answers.
Omission of essential working will result in loss of marks.
The intended marks for questions or part of questions are given in brackets [ ].
THIS QUESTION PAPER CONSISTS OF 6 PRINTED PAGES.

SECTION A (10 Marks)

(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 answer only.)

i) The following table shows a frequency distribution of height of 50 boys, find the mode of the heights.

Height (in cm)	150	151	152	153	154	155
No. of boys	4	6	10	15	5	10

(a) 150

(b) 155

(c) 153

(d) 152 and 155

ii) The slope of line parallel to x=2 is:

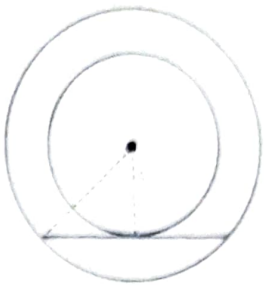
(a) 0

(b) 1

(c) -1

(d) not defined

iii) If radii of two concentric circles are 3 cm and 5 cm, then the length of each chord of one circle which is tangent to the other is:



(a) 6 cm

(b) 8 cm

(c) 9 cm

(d) 10 cm

iv) Which of the following points is invariant with respect to the line y=-2?

(a) (3,2)

(b) (3, -2)

(c) (2,3)

(d) (-2,3)

v) In a cylinder, if radius is halved and height is doubled then the volume will be:

(a) the same

(b) doubled

(c) halved

(d) four times

vi) The mid-point of the line segment joining the points (-4,6) and (-4,-2) is:

(a) (4,2)

(b) (-4, -2)

(c) (-4,2)

(d) (-2,2)

vii) During conversion of a solid from one shape to another, the volume of the new shape will:

(a) increase

(b) decrease

(c) remain same

(d) can't say anything.

viii) A ladder 24 m long rests against a wall. If the foot of the ladder is 12 m from the wall, then the angle of elevation is:

(a) 30°

(b) 60°

(c) 90°

(d) 45°

ix) If a fair coin is tossed twice, then the probability of getting two heads is:

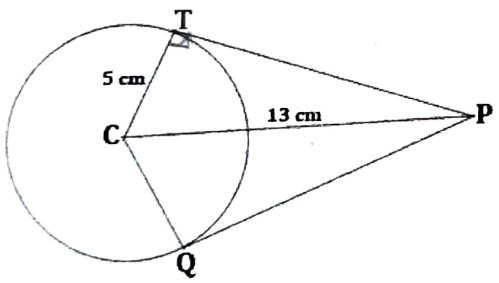
(a) $\frac{1}{2}$

(b) 0

(c) $\frac{1}{4}$

(d) $\frac{3}{4}$

x) In the figure, PT and PQ are the tangents to the circle with centre C. Find the length of the tangents PT and PQ.



(a) PT=12 cm and PQ=13 cm

(b) PT=13 cm and PQ=13 cm

(c) PT=12 cm and PQ=12 cm

(d) PT=12 cm and can't find PQ.

SECTION B (30 Marks)

(Attempt ***any three*** questions from this Section.)

Question 2

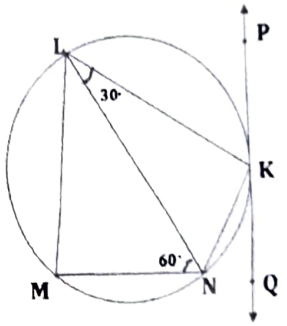
a) Find the equation of a line passing through the point (0,4) and parallel to the line $3x + 5y + 15 = 0$. [2]

b) A box contains 17 cards numbered 2,3,5,7,9,11,13,15,17,19,21,23,25,27,29,31,33 and are mixed thoroughly. A card is drawn at random from the box, find the probability that the number on the card is: [2]

i) a prime number

ii) divisible by 7.

c) In the given figure, KLMN is a cyclic quadrilateral and PQ is a tangent to the circle at K. If LN is a diameter of the circle, $\angle KLN = 30°$ *and* $\angle MNL = 60°$, determine: [3]



i) $\angle QKN$

ii) $\angle PKL$ and

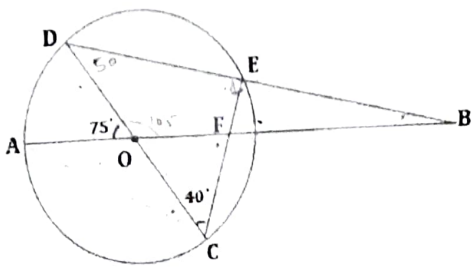
iii) $\angle MLN$

d) Prove that: [3]

$$tan^2\theta + cot^2\theta + 2 = cosec^2\theta sec^2\theta$$

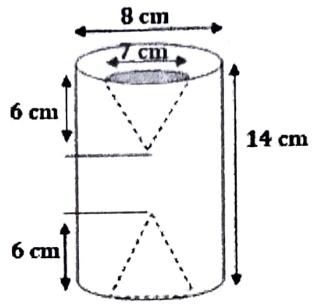
Question 3

a) In the given figure, AB and CD are two straight lines pass through the centre O of a circle. If $\angle OCE = 40°$ *and* $\angle AOD = 75°$, *find* $\angle CDE$ *and* $\angle OBE$. [2]



b) The line segment joining the points P (0,1) and Q (5,1) is divided at the point A in the ratio 3:2 and it lies on the line $3x - 18y + k = 0$. Find the value of 'k'. [2]

c) In the given figure, the height of a solid cylinder is 14 cm and diameter 8 cm. Two equal conical holes of diameter 7 cm and height 6 cm are drilled in it. Find the curved surface area and volume of the remaining solid. [3]



d) A pole of height 5m is fixed on the top of a tower. The angle of elevation of the top of the pole as observed from a point A on the ground is 60° and the angle of depression of the point A from the tower is 45°. Find the height of the tower correct to the nearest metre. $\{Take\ \sqrt{3} = 1.732\}$ [3]

Question 4

a) Tickets are numbered from 1 to 50. They are well-shuffled and a ticket is drawn at random. What is the probability of occurrence of following events? [2]

i) the drawn ticket has a number which is a perfect square.

ii) the drawn ticket has a number which is a multiple of 4 and 6.

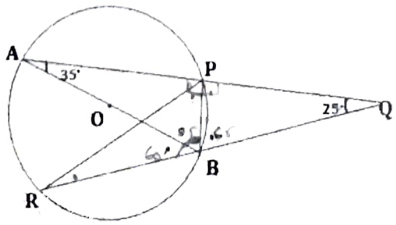
b) How many metres (correct to one decimal place) of cloth will be required to make a conical tent whose radius and height are 12 m and 16 m respectively? [2]

c) In the given figure, AB is diameter of a circle with centre O find: [3]

i) $\angle PBR$

ii) $\angle PRB$

iii) $\angle BPR$.



d) Use a graph paper for this question, plot the points A (4,2) and B (-1,2). [3]

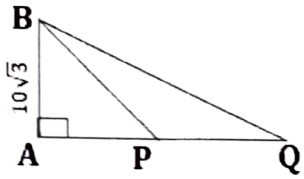
i) Reflect A and B in origin to get the images A' and B'.

ii) State the geometrical name for the figure ABA'B'.

iii) Find its area.

Question 5

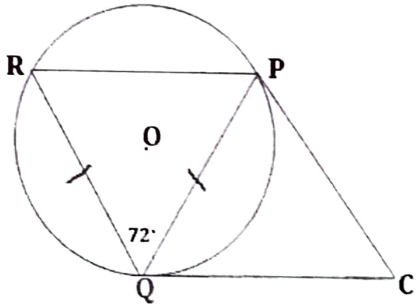
a) P and Q are two points observed from the top of a building $10\sqrt{3}$ m high. If the angles of depression of the points are $60°\ and\ 30°$, find the distance of the two points from the building, given that PQ=20m. [2]



b) In the given figure, $PQ = RQ, \angle RQP = 72°$,
$PC\ and\ QC\ are\ tangents\ to\ the\ circle\ with\ centre\ O. Calculate$: [2]

i) the measure of the angle subtended by the chord PQ at the centre and

ii) $\angle PCQ$

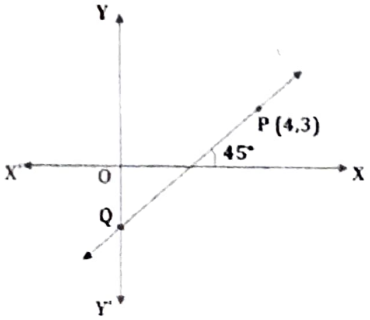


c) The line through P (4,3) intersects y-axis at Q: [3]

i) Write the slope of the line.

ii) Write the equation of line.

iii) Write the coordinates of point Q.



d) The mean of the following distribution is 52 and the frequency of class interval 30-40 is 'f'.

Find f: [3]

C.I.	10-20	20-30	30-40	40-50	50-60	60-70	70-80
frequency	5	3	f	7	2	6	13

Question 6

a) The trunk of a tree is cylindrical and its circumference is 176 cm. If the length of the trunk is 3 m, find the volume of the timber that can be obtained from the trunk. [2]

b) Find the ratio in which P(3,6) divides the join of A(2,5) and B(5,8). [2]

c) Prove that: [3]

$$\cos A\,(1+\cot A)+\sin A\,(1+\tan A)=\sec A\ +cosec\ A$$

d) The monthly income of a group of 320 employees in a company is given below: [3]

Monthly Income (₹)	No. of Employees
10000-11000	20
11000-12000	45
12000-13000	65
13000-14000	95
14000-15000	60
15000-16000	30
16000-17000	5

Draw an ogive of the given distribution on a graph sheet and determine:

i) the median wage

ii) the number of employees whose income is below ₹11,500.

iii) If the salary of a senior employee is above ₹ 14,500, find the number of senior employees in the company.

iv) the upper quartile.