MATHEMATICS (X)
Maximum Marks: 40

Time allowed: One and a half hours
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 questions from Section A and any three questions from Section B.
The intended marks for questions or parts of questions are given in brackets [ ]

Section A

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

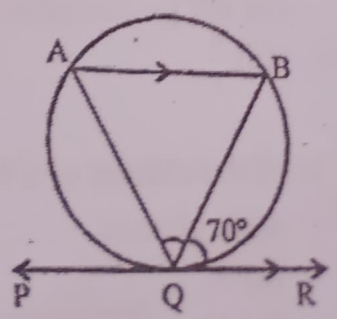
Question 1

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

i. The reflection of the point P(1,-2) in the line $y = -1$ is
   (a) $(-3, -2)$
   (b) $(1, -4)$
   (c) (1,4)
   (d) (1,0)

ii. The inclination of the line $y = \sqrt{3}x - 5$ is
   (a) 30°
   (b) 60°
   (c) 45°
   (d) 0°

iii. In the given figure, PQR is a tangent at Q to a circle. If AB is a chord parallel to PR and $\angle BQR = 70°$, then $\angle AQB$ is equal to
   (a) 20°
   (b) 40°
   (b) 35°
   (d) 45°



iv. If one end of a diameter of a circle is (2, 3) and the centre is (– 2, 5), then the other end is
(a) (– 6, 7)
(b) (6, – 7)
(c) (0, 8)
(d) (0, 4)

v. If two cylinders of the same lateral surface have their radii in the ratio 4 : 9, then the ratio of their heights is
(a) 2 : 3
(b) 3 : 2
(c) 4 : 9
(d) 9 : 4

vi. (sec A + tan A) (1 – sin A) is equal to
(a) sec A
(b) sin A
(c) cosec A
(d) cos A

vii. If the length of the shadow of a tower is $\sqrt{3}$ times that of its height, then the angle of elevation of the sun is
(a) 15°
(b) 30°
(c) 45°
(d) 60°

viii. A bag contains 3 red balls, 5 white balls and 7 black balls. The probability that a ball drawn from the bag at random will be neither red nor black is
(a) $\frac{1}{5}$
(b) $\frac{1}{3}$
(c) $\frac{7}{15}$
(d) $\frac{8}{1}$

ix. If the classes of a frequency distribution are 1-10, 11-20, 21-30, …, 51-60, then the size of each class is
(a) 9
(b) 10
(c) 11
(d) 5.5

Frequency	4	5	13	20	14	7	4

The difference of the upper limit of the median class and the lower limit of the modal class is

(a) 0

(b) 19

(c) 20

(d) 38

Section B

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

Question 2.

(i) A coin is tossed once. Find the probability of: [2]

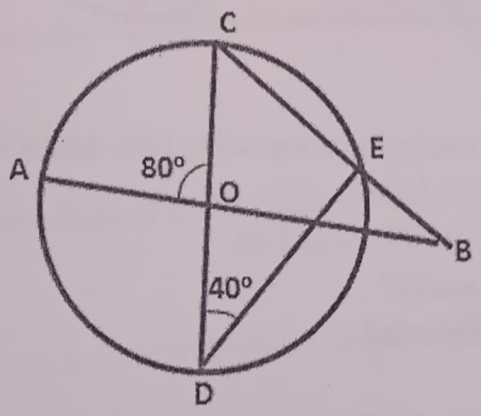
(a) getting a tail

(b) not getting a tail

(ii) In the figure given alongside, AB and CD are straight lines through the centre O of a circle. If $\angle AOC = 80°$ and $\angle CDE = 40°$. Find the number of degrees in [2]

(a) $\angle DCE$;

(b) $\angle ABC$.



(iii) Find the equation of the line passing through the point (1, 4) and intersecting the line $x - 2y - 11 = 0$ on the y- axis. [3]

(iv) Marks obtained by 40 students in a short assessment are given below, where a and b are two missing data. If the mean of the distribution is 7.2, find a and b. [3]

Marks	5	6	7	8	9
No. of Students	6	a	16	13	b

Question 3.

(i) Prove: $cot^2A - cot^2B = \frac{cos^2A - cos^2B}{sin^2A\, sin^2B}$ [2]

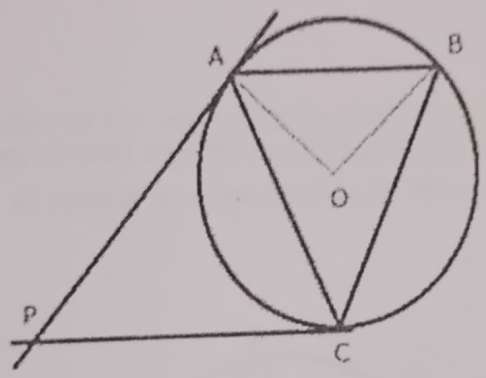
(ii) In what ratio is the line joining (2, -4) and (-3, 6) divided by the y-axis. [2]

(iii) Find the probability that a number selected at random from the numbers 1,2, 3...35 is a [3]
(a) prime number
(b) multiple of 7
(c) multiple of 3 or 5

(iv) A cylindrical roller made of iron is 2m long. Its inner diameter is 35cm and the thickness is 7cm all around. Find the weight of the roller in kg if 1 cm^3 of iron weighs 8 g. [3]

Question 4.

(i) In the given figure, O is the centre of the circumcircle ABC. Tangents at A and C intersect at P. Given angle AOB = 140^0 and angle APC=80^0, find the angle BAC. [2]



(ii) A boy scored following marks in various class tests during a term; each test being marked out of 20. [2]
15, 17, 16, 7, 10, 12, 14, 16, 19, 12 and 16
(a) What are his modal marks?
(b) What are his median marks?

(iii) A man standing on the bank of a river observes that the angle of elevation of a tree on the opposite bank is 60^o. When he moves 50 m away from the bank, he finds the angle of elevation to be 30^o. Calculate: [3]
(a) the width of the river;
(b) the height of the tree.

(iv) Points A and B have co-ordinates (3,4) and (0,2) respectively. Find the image: [3]
(a) A' of A under reflection in the x-axis.
(b) B' of B under reflection in the line AA'.
(c) A'' of A under reflection in the y-axis.

Question 5.

(i) The diameters of two cones are equal. If their slant heights are in the ratio 5:4, find the ratio of their curved surface areas. [2]

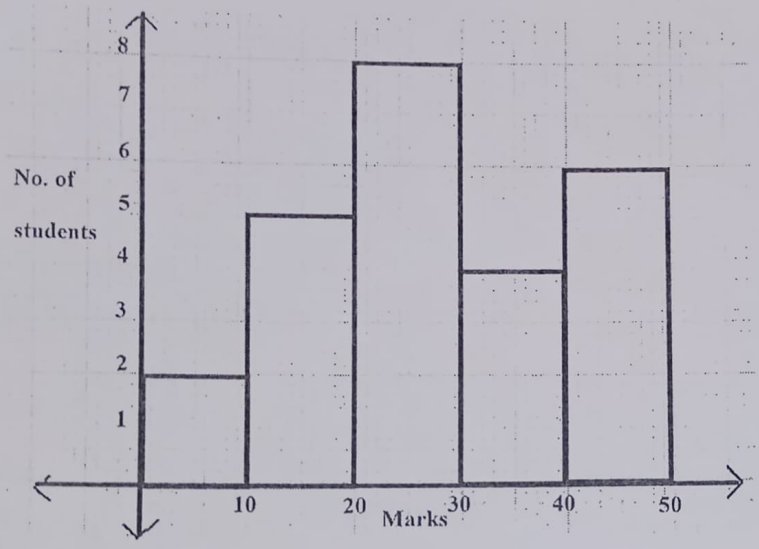
(ii) Prove: $\sqrt{sec^2A + cosec^2A} = tan\,A + cot\,A$ [2]

(iii) The histogram below represents the scores obtained by 25 students in a Mathematics mental test. Use the data to: [3]

(a) Frame a frequency distribution table.

(b) To calculate mean.

(c) To determine the Modal class.



(iv) $B(-5,6)$ and $D(1,4)$are the vertices of Rhombus $ABCD$. Find the equation of diagonal BD and diagonal AC. [3]

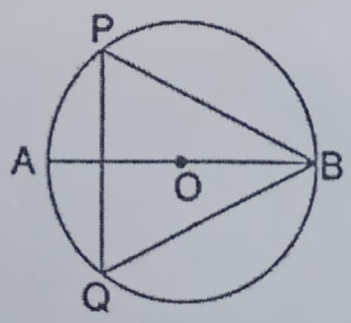
Question 6.

(i) The circumference of the base of a 12 m high conical tent is 66 m. Find the volume of the air contained in it. [2]

(ii) The given figure shows a circle with centre O and $\angle ABP = 42^0$. Calculate the measure of [2]

(a) $\angle PQB$

(b) $\angle QPB + \angle PBQ$



(iii) A vertical pole and a vertical tower are on the same level ground. From the top of the pole the angle of elevation of the top of the tower is 60^0 and the angle of depression of the foot of the tower is 30^0. Find the height of the tower if the height of the pole is 20m. [3]

(iv) The marks obtained by 120 students in a Mathematics test is given in the table below:
Draw an ogive for the distribution on a graph sheet. Use a suitable scale for your ogive. [3]
Use the ogive to estimate:

(a) The number of students who obtained more than 75% in the test.
(b) The number of students who did not pass in the test if the pass percentage was 40.
(c) The lower quartile.

Marks	No. of students
0-10	5
10-20	9
20-30	16
30-40	22
40-50	26
50-60	18
60-70	11
70-80	6
80-90	4
90-100	3

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