



SHREE CHANDULAL NANAVATI VINAYMANDIR
SECOND PRELIMINARY EXAMINATION
MATHEMATICS
2021-2022

Grade: 10
Marks: 40

Date: 07/03/2022
Time: 1 hour 30 mins

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

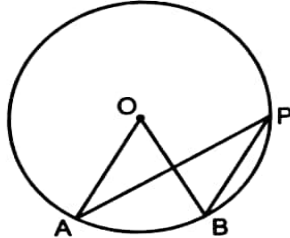
The intended marks for questions or parts of questions are given in brackets [].

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.)

- (i) The reflection of the point A (4, -1) in the line $x = 2$ is:
- (a) (0, -1) (b) (8, -1) (c) (0, 1) (d) (-1, 0)
- (ii) The point P (1, 2) divides the join of A (-2, 1) and B (7, 4) in the ratio:
- (a) 2 : 1 (b) 1 : 2 (c) 3 : 2 (d) 2 : 3
- (iii) The angle of inclination of the line $y = \frac{1}{\sqrt{3}}x - 5$
- (a) 90° (b) 30° (c) 60° (d) 0°
- (iv) In the given figure, O is the centre of the circle. If $\angle APB = 30^\circ$, then $\angle AOB =$
- (a) 60° (b) 30° (c) 15° (d) Indeterminate
- 

(vi) $(\cos^2 A - 1)(1 + \cot^2 A) =$
(a) 1 (b) $\tan A$ (c) $\cot A$ (d) -1

(vii) An ogive is always started from a point on the

- (a) x-axis representing the lower limit of the first class and is terminated at the lower limit of the last class.
- (b) x-axis representing the upper limit of the first class and is terminated at the lower limit of the last class.
- (c) x-axis representing the lower limit of the first class and is terminated at the upper limit of the last class.
- (d) x-axis representing the upper limit of the first class and is terminated at the upper limit of the last class.

(viii) A bag contains 4 red and 8 blue marbles. A marble is drawn at random. The probability of drawing a red marble is:

- (a) $\frac{1}{2}$ (b) $\frac{2}{3}$ (c) $\frac{1}{4}$ (d) $\frac{1}{3}$

(ix) If Malak reshaped a cone of height h cm and radius of base r cm into a cylinder, then which of the following options is always correct:

- (a) Surface area of cone = Surface area of cylinder
- (b) Radius of cone = Radius of cylinder
- (c) Volume of cone = Volume of cylinder
- (d) Curved surface area of cone = Curved surface area of the cylinder

(x) For a grouped frequency distribution, we use $\bar{X} = \frac{\sum fx}{\sum f}$, here x stands for:

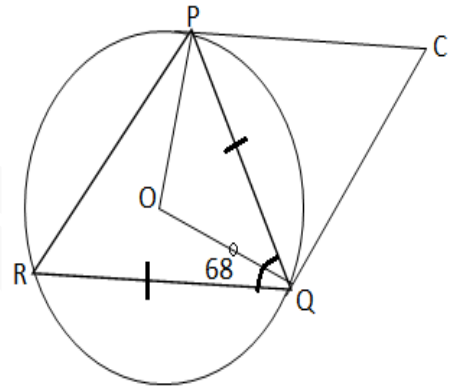
- (a) Width of a class
- (b) Lower limit of a class
- (c) Class mark of a class
- (d) Upper limit of a class

SECTION B

(Attempt any three questions from this Section.)

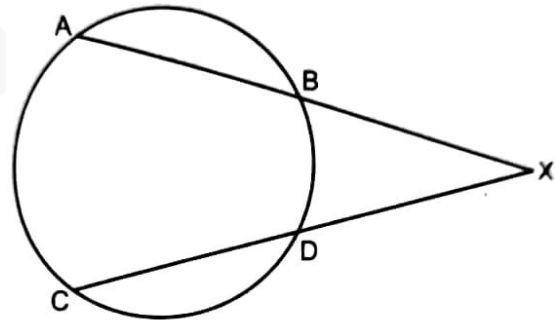
Question 2

- (i) A (2, 5), B (1, 0), C (-4, 3) and D (-3, 8) are the vertices of quadrilateral ABCD. Find the co-ordinates of the mid-points of AC and BD. Give a special name to the quadrilateral. [2]
- (ii) If two-digit numbers are made with 3,5,7, and 9, what is the probability that the number is: [2]
- (a) Greater than 55
- (b) A prime number
- (iii) In the given figure, $PQ = RQ$, $\angle RQP = 68^\circ$, PC and QC are tangents to the circle with centre O. Calculate the value of: [3]
- (a) $\angle QOP$
- (b) $\angle QCP$
- (c) $\angle CPQ$
- (iv) Two objects are located on the same side of the tower. Their angles of depression as observed from the top of the tower are 45° and 60° . Find the distance between the two objects if the height of the tower is 180 meters. [3]



Question 3

- (i) In the given figure, chords AB and CD when extended meet at X. Given $AB = 4$ cm, $BX = 6$ cm, $XD = 5$ cm, calculate the length of CD. [2]
- (ii) A circular tank of diameter 2 m is dug and the earth removed is spread uniformly all around the tank to form an embankment 2 m in width and 1.6 m in height. Find the depth of the circular tank. [2]
- (iii) Prove that: $(1 + \cot \theta - \operatorname{cosec} \theta)(1 + \tan \theta + \sec \theta) = 2$ [3]
- (iv) Calculate the mean of the following frequency distribution. [3]



Class-interval	84-90	90-96	96-102	102-108	108-114
Frequency	8	12	15	10	5

Question 4

- (i) The equation of a line is $2\sqrt{3}x - 2y + 5 = 0$. Find the: [2]
 (a) slope of the line.
 (b) y-intercept.

- (ii) Find the mean of the following data: [2]

Class-interval	0–10	10–20	20–30	30–40	40–50
Frequency	6	8	3	6	2

- (iii) An exhibition tent is in the form of a cylinder surmounted by a cone. The height of the tent above the ground is 85 m and the height of the cylindrical part is 50 m. If the diameter of the base is 168 m, find the quantity of canvas required to make the tent. [3]

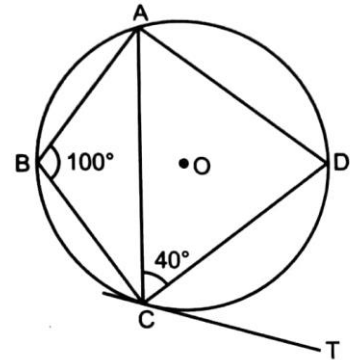
- (iv) The daily wages of 40 workers in a project are given below: [3]

Wages (₹)	400–450	450–500	500–550	550–600	600–650
No. of workers	2	6	14	10	8

Use a graph paper to draw an ogive for the above distribution. Use your ogive to estimate the median. Use the scale 2 cm = ₹50 on the x-axis and 2 cm = 4 workers on the y-axis.

Question 5

- (i) In the given circle with centre O, $\angle ABC = 100^\circ$, $\angle ACD = 40^\circ$ and CT is a tangent to the circle at C. Find: [2]
 (a) $\angle ADC$
 (b) $\angle DCT$



- (ii) Prove that: $(\cot^2 A - \operatorname{cosec}^2 A)(\tan^2 A - \sec^2 A) = 1$ [2]
- (iii) P (3, 4), Q (7, -2) and R (-2, -1) are the vertices of triangle PQR. Find the equation of the median of the triangle through R. [3]
- (iv) Use a graph paper for this question. Plot the points O (0, 0), A (-4, 4), B (-3, 0) and C (0, -3). Use scale 2 cm = 1 unit on both the axes. [3]
 (a) Reflect the points A and B on the y-axis and name them A' and B' respectively. Write down their coordinates.
 (b) Name the figure OACB'A'.

Question 6

- (i) Coordinates of the vertices of a triangle are (4, 2), (5, 6), and (-3, -5). Find the co-ordinates of the centroid. [2]
- (ii) If a coin is tossed two times, what is the probability of: [2]
- (a) getting head at least once.
- (b) getting exactly one head.
- (iii) An aeroplane is flying at a height of 300 m above the ground. Flying at this height, the angles of depression from the plane to two points on both banks of a river in opposite directions are 45° and 60° respectively. Find the width of the river correct to three significant figures. (Use $\sqrt{3} = 1.732$). [3]
- (iv) The daily profits in ₹ of 100 shops in a departmental store are distributed as follows: [3]

Profit per shop (₹)	0–100	100–200	200–300	300–400	400–500
No. of shops	8	12	18	27	17

Estimate the mode of the given data. Use the scale 2 cm = ₹100 on the x-axis and 2 cm = 4 shops on the y-axis.
