

# BOARD QUESTION PAPER: MARCH 2023

## Mathematics Part - II

Time: 2 Hours

Max. Marks: 40

Note:

- i. All questions are compulsory.
- ii. Use of calculator is not allowed.
- iii. The numbers to the right of the questions indicate full marks.
- iv. In case of MCQs [Q. No. 1(A)] only the first attempt will be evaluated and will be given credit.
- v. For every MCQ, the correct alternative (A), (B), (C) or (D) with sub-question number is to be written as an answer.
- vi. Draw the proper figures for answers wherever necessary.
- vii. The marks of construction should be clear and distinct. Do not erase them.
- viii. Diagram is essential for writing the proof of the theorem.

**Q.1. (A) Four alternative answers are given for every subquestion. Select the correct alternative and write the alphabet of that answer:** [4]

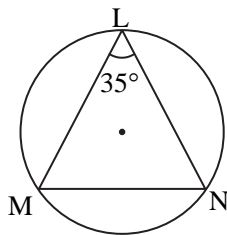
1. If  $a, b, c$  are sides of a triangle and  $a^2 + b^2 = c^2$ , name the type of triangle:  
 (A) Obtuse angled triangle (B) Acute angled triangle  
 (C) Right angled triangle (D) Equilateral triangle
2. Chords AB and CD of a circle intersect inside the circle at point E. If  $AE = 4, EB = 10, CE = 8$ , then find ED:  
 (A) 7 (B) 5 (C) 8 (D) 9
3. Co-ordinates of origin are \_\_\_\_\_.  
 (A) (0, 0) (B) (0, 1) (C) (1, 0) (D) (1, 1)
4. If radius of the base of cone is 7 cm and height is 24 cm, then find its slant height:  
 (A) 23 cm (B) 26 cm (C) 31 cm (D) 25 cm

**(B) Solve the following sub-questions:** [4]

1. If  $\triangle ABC \sim \triangle PQR$  and  $\frac{A(\triangle ABC)}{A(\triangle PQR)} = \frac{16}{25}$ , then find  $AB : PQ$ .
2. In  $\triangle RST$ ,  $\angle S = 90^\circ, \angle T = 30^\circ, RT = 12$  cm, then find RS.
3. If radius of a circle is 5 cm, then find the length of longest chord of a circle.
4. Find the distance between the points  $O(0, 0)$  and  $P(3, 4)$ .

**Q.2. (A) Complete the following activities (any two):** [4]

1.



In the above figure,  $\angle L = 35^\circ$ , find:

- i.  $m(\text{arc } MN)$
- ii.  $m(\text{arc } MLN)$

**Solution:**

i.  $\angle L = \frac{1}{2} m(\text{arc } MN)$  ... (By inscribed angle theorem)

$\therefore \square = \frac{1}{2} m(\text{arc } MN)$

$\therefore 2 \times 35 = m(\text{arc } MN)$

$\therefore m(\text{arc } MN) = \square$

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ii.  $m(\text{arc MLN}) = \square - m(\text{arc MN}) \dots(\text{Definition of measure of arc})$   
 $= 360^\circ - 70^\circ$   
 $\therefore m(\text{arc MLN}) = \square$

2. Show that,  $\cot\theta + \tan\theta = \text{cosec}\theta \times \sec\theta$

**Solution:**

L.H.S =  $\cot\theta + \tan\theta$   
 $= \frac{\cos\theta}{\sin\theta} + \frac{\sin\theta}{\cos\theta}$   
 $= \frac{\square + \square}{\sin\theta \times \cos\theta}$   
 $= \frac{1}{\sin\theta \times \cos\theta} \dots \square$   
 $= \frac{1}{\sin\theta} \times \frac{1}{\square}$   
 $= \text{cosec}\theta \times \sec\theta$

L.H.S = R.H.S

$\therefore \cot\theta + \tan\theta = \text{cosec}\theta \times \sec\theta$

3. Find the surface area of a sphere of radius 7 cm.

**Solution:**

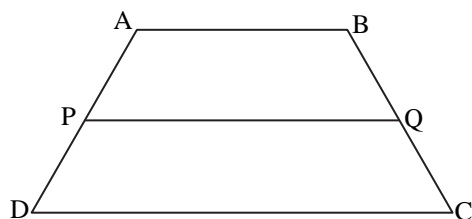
Surface area of sphere =  $4\pi r^2$   
 $= 4 \times \frac{22}{7} \times \square^2$   
 $= 4 \times \frac{22}{7} \times \square$   
 $= \square \times 7$

$\therefore$  Surface area of sphere =  $\square$  sq.cm.

(B) Solve the following sub-questions(Any four):

[8]

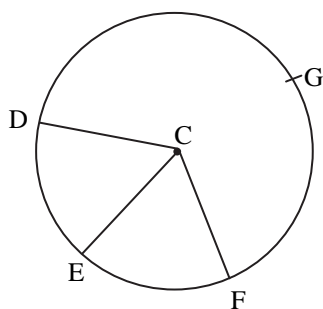
1.



In trapezium ABCD side  $AB \parallel$  side  $PQ \parallel$  side  $DC$ .  $AP = 15$ ,  $PD = 12$ ,  $QC = 14$ , find  $BQ$ .

2. Find the length of the diagonal of a rectangle whose length is 35 cm and breadth is 12 cm.

3.



In the given figure points G, D, E, F are points of a circle with centre C,  $\angle ECF = 70^\circ$ ,  $m(\text{arc DGF}) = 200^\circ$ .

Find:

- i.  $m(\text{arc DE})$       ii.  $m(\text{arc DEF})$ .

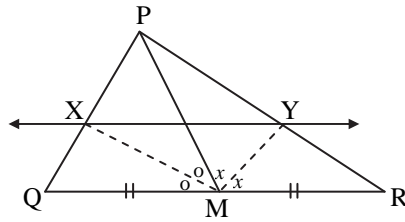


4. Show that points A(-1, -1), B(0, 1), C(1, 3) are collinear.
5. A person is standing at a distance of 50 m from a temple looking at its top. The angle of elevation is of  $45^\circ$ . Find the height of the temple.

**Q.3. (A) Complete the following activities (any one):**

[3]

1.



In  $\Delta PQR$ , seg  $PM$  is a median. Angle bisectors of  $\angle PMQ$  and  $\angle PMR$  intersect side  $PQ$  and side  $PR$  in points  $X$  and  $Y$  respectively. Prove that  $XY \parallel QR$ .  
Complete the proof by filling in the boxes.

**Solution:**

In  $\Delta PMQ$ ,

Ray  $MX$  is the bisector of  $\angle PMQ$

$$\therefore \frac{MP}{MQ} = \frac{PX}{XQ} \quad \dots\text{(I) [Theorem of angle bisector]}$$

Similarly, in  $\Delta PMR$ , Ray  $MY$  is bisector of  $\angle PMR$

$$\therefore \frac{MP}{MR} = \frac{PY}{YR} \quad \dots\text{(II) [Theorem of angle bisector]}$$

$$\text{But } \frac{MP}{MQ} = \frac{MP}{MR} \quad \dots\text{(III) [As } M \text{ is the midpoint of } QR]$$

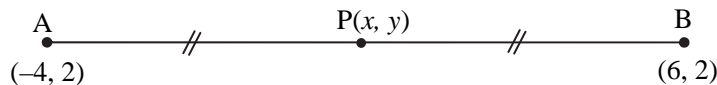
Hence  $MQ = MR$

$$\therefore \frac{PX}{XQ} = \frac{PY}{YR} \quad \dots\text{[From (I), (II) and (III)]}$$

$$\therefore XY \parallel QR \quad \dots\text{[Converse of basic proportionality theorem]}$$

2. Find the co-ordinates of point  $P$  where  $P$  is the midpoint of a line segment  $AB$  with  $A(-4, 2)$  and  $B(6, 2)$ .

**Solution:**



Suppose,  $(-4, 2) = (x_1, y_1)$  and  $(6, 2) = (x_2, y_2)$  and co-ordinates of  $P$  are  $(x, y)$

$\therefore$  According to midpoint theorem,

$$x = \frac{x_1 + x_2}{2} = \frac{\square + 6}{2} = \frac{\square}{2} = \square$$

$$y = \frac{y_1 + y_2}{2} = \frac{2 + \square}{2} = \frac{4}{2} = \square$$

$\therefore$  Co-ordinates of midpoint  $P$  are  $\square$



**(B) Solve the following sub-questions (any two):**

[6]

1. In  $\Delta ABC$ , seg  $AP$  is a median. If  $BC = 18$ ,  $AB^2 + AC^2 = 260$ , find  $AP$ .
2. Prove that, "Angles inscribed in the same arc are congruent".
3. Draw a circle of radius 3.3 cm. Draw a chord  $PQ$  of length 6.6 cm. Draw tangents to the circle at points  $P$  and  $Q$ .
4. The radii of circular ends of a frustum are 14 cm and 6 cm respectively and its height is 6 cm. Find its curved surface area. ( $\pi = 3.14$ )

**Q.4. Solve the following sub-questions (any two):**

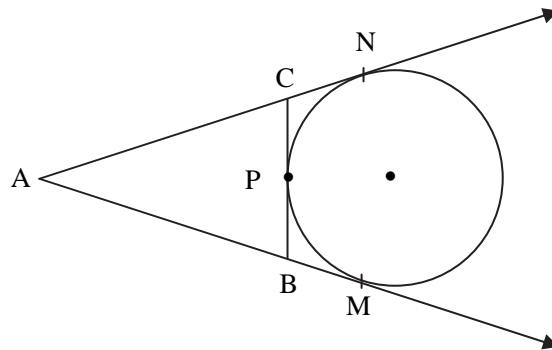
[8]

1. In  $\triangle ABC$ , seg  $DE \parallel$  side  $BC$ . If  $2A(\triangle ADE) = A(\square DBCE)$ , find  $AB : AD$  and show that  $BC = \sqrt{3} DE$ .
2.  $\triangle SHR \sim \triangle SVU$ . In  $\triangle SHR$ ,  $SH = 4.5$  cm,  $HR = 5.2$  cm,  $SR = 5.8$  cm and  $\frac{SH}{SV} = \frac{3}{5}$ , construct  $\triangle SVU$ .
3. An ice-cream pot has a right circular cylindrical shape. The radius of the base is 12 cm and height is 7 cm. This pot is completely filled with ice-cream. The entire ice-cream is given to the students in the form of right circular ice-cream cones, having diameter 4 cm and height is 3.5 cm. If each student is given one cone, how many students can be served?

**Q.5. Solve the following sub-questions (any one):**

[3]

1.



A circle touches side  $BC$  at point  $P$  of the  $\triangle ABC$ , from out-side of the triangle. Further extended lines  $AC$  and  $AB$  are tangents to the circle at  $N$  and  $M$  respectively.

Prove that:  $AM = \frac{1}{2}$  (Perimeter of  $\triangle ABC$ )

2. Eliminate  $\theta$  if  $x = r \cos \theta$  and  $y = r \sin \theta$ .

