Time: 2 hours **Board Paper – March 2023** **Total Marks: 40**

Note: (i) All questions are compulsory.
(ii) Use of a 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 subquestion number is to be written as an answer.

Q.1. (A) Four alternative answers are given for every sub-question. 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

Q.1. (B) Solve the following sub-questions. **[4]**

(1) If $\Delta ABC \sim \Delta PQR$ and $\frac{A(\Delta ABC)}{A(\Delta PQR)} = \frac{16}{25}$, then find AB:PQ.

(2) In ΔRST, $\angle S = 90°$, $\angle T = 30°$, RT = 12 cm, then find RS.

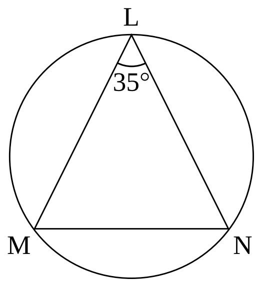
(3) If radius of a circle is 5 cm, then find the length of the longest chord of the circle.

(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 given figure, ∠L = 35°, find:

a. *m*(arc MN) b. *m*(arc MLN)



Solution:

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

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

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

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

b. $m(\text{arc MLN}) = \square - m(\text{arc MN})$ ...... [Definition of measure of arc]

$= 360° - 70°$

$m(\text{arc MLN}) = \square$

(2) Show that cot θ + tan θ = cosec θ × sec θ

Solution:

$$\text{L.H.S} = \cot\theta + \tan\theta$$

$$= \frac{\cos\theta}{\sin\theta} + \frac{\sin\theta}{\cos\theta}$$

$$= \frac{\square + \square}{\sin\theta \times \cos\theta}$$

$$= \frac{1}{\sin\theta \times \cos\theta} \text{ .... } \square$$

$$= \frac{1}{\sin\theta} \times \frac{1}{\square}$$

$$= \operatorname{cosec}\theta \times \sec\theta$$

L.H.S. = R.H.S.

$\therefore$ cot θ + tan θ = cosec θ × sec θ

(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

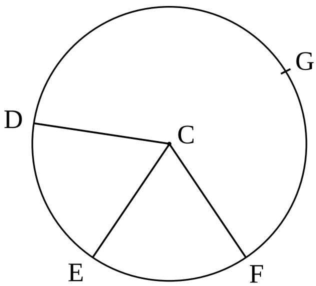
Q.2. (B) Solve the following sub-questions. (Any *four*) **[8]**

(1)

In trapezium ABCD side AB || side PQ || 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, $\angle ECF = 70°$, m(arc DGF) = 200°.

Find:

a. m(arc DE)

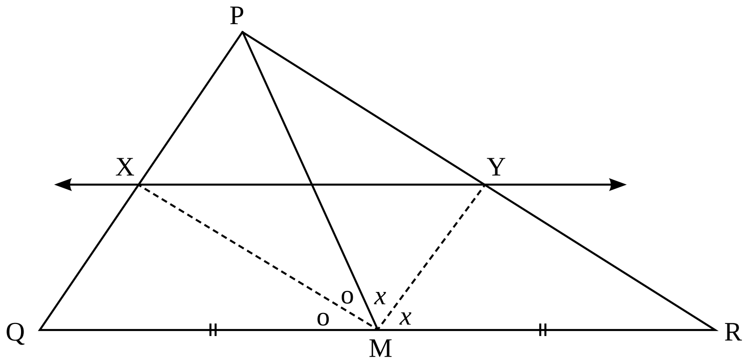
b. m(arc DEF)

(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°. Find the height of the temple.

Q.3. (A) Complete the following activities. (Any *one*) **[3]**

(1)



In ΔPQR, seg PM is a median. Angle bisectors of ∠PMQ and ∠PMR intersect side PQ and side PR in points X and Y respectively. Prove that XY || QR.

Complete the proof by filling in the boxes.

Solution:

In ΔPMQ,

Ray MX is the bisector of ∠PMQ.

$\therefore \quad \frac{MP}{MQ} = \frac{\square}{\square}$ ....(I) (Theorem of angle bisector)

Similarly, in ΔPMR, Ray MY is the bisector of ∠PMR.

$\therefore \quad \frac{MP}{MR} = \frac{\square}{\square}$ ....(II) (Theorem of angle bisector)

But $\frac{MP}{MQ} = \frac{MP}{MR}$ ....(III) (As M is the midpoint of QR)

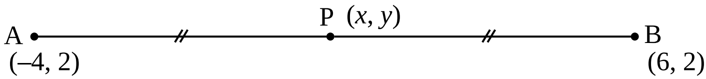
Hence MQ = MR.

$\therefore \quad \frac{PX}{\square} = \frac{\square}{YR}$ ....[From (I), (II) and (III)]

$\therefore$ XY || QR ....[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).

∴ According to midpoint theorem,

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

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

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

Q.3. (B) Solve the following sub-questions. (Any *two*) **[6]**

(1) In ΔABC, 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]**

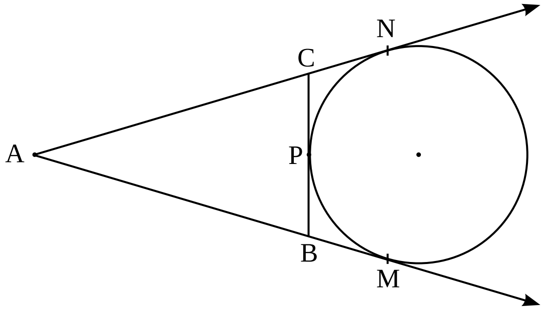
(1) In ΔABC, seg DE || side BC. If 2A(ΔADE) = A(□DBCE), find AB:AD and show that BC = $\sqrt{3}$DE.

(2) ΔSHR ~ ΔSVU. In ΔSHR, SH = 4.5 cm, HR = 5.2 cm, SR = 5.8 cm and $\frac{SH}{SV} = \frac{3}{5}$, construct ΔSVU.

(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 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 ΔABC, from outside of the triangle. Further extended lines AC and AB are tangents to the circle at N and M respectively. Prove that:

$$AM = \frac{1}{2} \text{(Perimeter of } \Delta ABC)$$

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

SOLUTION