STD: IX   **Marks: 80**
Date: 22/02/2024   **Time: 2½hrs**

Attempt **all** questions from **Section A** and **any four** 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 answer.
Omission of essential working will result in loss of marks. 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.   **[15]**
(Do not copy the questions, write the correct answer only)

    i.   In the given figure, ABCD is a rectangle in which AB = 6 cm and AD = 8 cm. If P and
    Q are mid points of sides BC and CD respectively, then length of PQ is:

        a. 7 cm
        b. 5 cm
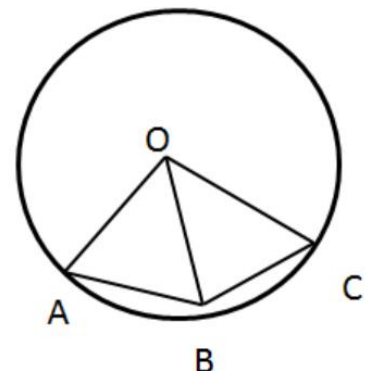   **c.** 4 cm
        d. 3 cm
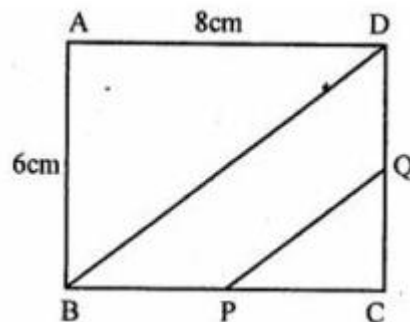
    ii.   In the figure given below, ABC is an equilateral triangle. Base BC is produced to E,
    such that BC'= CE.
    Calculate ∠ACE and ∠AEC.

        a. ∠ACE =100°, ∠AEC = 30°
        b. ∠ACE =120°, ∠AEC = 30°
        c. ∠ACE =100°, ∠AEC = 50°
        d. ∠ACE =120°, ∠AEC = 50°
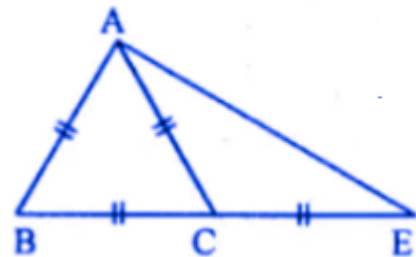
    iii.   In the given figure, arc AB and arc BC are equal in
    length. If ∠ AOB = 48°, find: (i) ∠BOC (ii) ∠OBC

        a. ∠BOC =48° , ∠OBC = 48°
        b. ∠BOC =48° , ∠OBC = 66°
        c. ∠BOC =58° , ∠OBC = 78°
   **d.** ∠BOC =35° , ∠OBC = 57°

iv. AD is a diameter of a circle and AB is a chord. If AD = 34 cm, AB = 30 cm, the distance of AB from the centre of the circle is

    a. 17 cm
    b. 15 cm
    c. 4 cm
    d. 8 cm
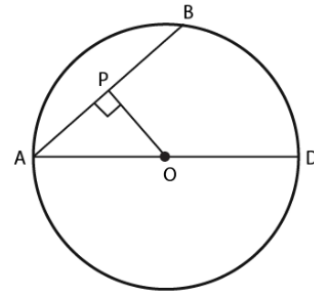
v. The figure given below show the cross section of a swimming pool 10 m broad, 2 m deep at one end and 3 m deep at the other end. Calculate the volume of water it will hold when full, given that its length is 40 m.

    a. 1000 m³
    b. 2000 m³
    c. 2500 m³
    d. 3000 m³
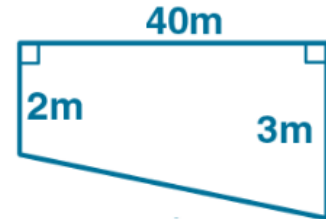
vi. The lateral surface area of a cube is 256 m², its volume is

    a. 512 m³   **b.** 216 m³
    c. 64 m³   **d.** 256 m³

vii. The length of the longest pole that can be put in a room of dimensions. (10m x 10m x 5m) is

    a. 15 m   **b.** 16m
    c. 10 m   **d.** 12 m

viii. If cos A = 4/5, then the value of tan A is

    a. 3/5   **b.** 3/4
    c. 4/3   **d.** 5/3

ix. (sin 65° / cos 25°) + (cos 32° /sin 58°) – sin 28° sec 62° + cosec2 30°

    a. 2   **b.** 3
    c. 4   **d.** 5

x. In which quadrant or on which axis each of the following points lie? (-3, 5), (4, -1) (2, 0), (2, 2)
    a. 3rd quadrant, 4th quadrant, x-axis, 2nd quadrant
    b. 3rd quadrant, x-axis, 1st quadrant, y-axis
    c. 2nd quadrant, 4th quadrant, x-axis, 1st quadrant
    d. x - axis, 1st quadrant, 3rd quadrant, 4th quadrant

xi. The distance of the point P (2, 3) from the x-axis is

    a. 2   **b.** 3
    c. 1   **d.** 5

xii. The mode of the given data: 4, 6, 5, 9, 3, 2, 7, 7, 6, 5, 4, 9, 10, 10, 3, 4, 7, 6, 9, 9 is;

a. 7

b. 9

c. 10

d. 6

xiii. If A and B are two complementary acute angles, then we have: sin A = _____

a. Cos A

b. Cos B

c. Sin B

d. Cosec A

xiv. Find the distance between the points (7,1) and (3,4).

a. 1 Units.

b. 15 Units.

c. 5 Units.

d. 20 Units.

xv. The value of Cos A is _____.
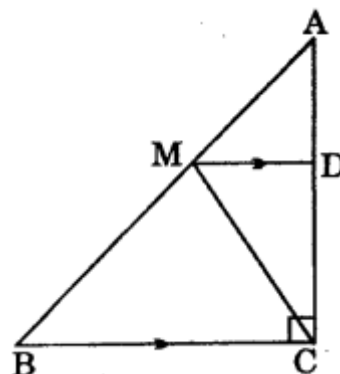
a. ⁴⁄₃

b. ¾

c. ⅗

d. ⅝

Question 2.

a. If θ is an acute angle and tan θ = 5/12, find the value of cos θ + cot θ. **[4]**

b. Construct a rectangle each of whose diagonals measures 6 cm and the diagonals intersect at an angle of 45°. **[4]**

c. In a class of 90 students, the marks obtained in a weekly test were as under.

Marks	16 – 20	21 – 25	26 – 30	31 – 35	36 – 40	41 – 45	46 – 50
No. of Students	4	12	18	26	14	10	6

Construct a combined histogram and frequency polygon. **[4]**

Question 3.

a. ABC is a triangle right angled at C. A line through the mid-point M of hypotenuse AB and parallel to BC intersects AC at D. Show that.
(i)   D is mid-point of AC
(ii)   MD perpendicular to AC
(iii)   CM = MA = 1/2 AB. **[5]**

b. The volume of a cuboidal block of silver is 10368 cm³. If its dimensions are in the ratio 3:2:1, find :
(i)   Dimensions of the block.
(ii)   Cost of gold polishing its entire surface at ₹0.50 per cm². **[4]**

**c.** Draw the graph of the equations 2x – 3y = 7 and x + 6y = 11 and find their solutions. **[4]**

Question 4.

a. The area of a trapezium is 540 cm². If the ratio of parallel sides is 7: 5 and the distance between them is 18 cm, find the length of parallel sides. **[3]**

b. Without using tables, evaluate: **[3]**

$$\frac{\sec^2 54° - \cot^2 36°}{\csc^2 57° - \tan^2 33°} + 2\sin^2 38.\sec^2 52° - \sin^2 45°$$

c. Find the value of x, if tan 3x = sin 45° cos 45° + sin 30°. **[4]**

Question 5.

a. Draw the parallelogram ABCD in which AB = BC = 4.8 cm and AC = 7.5 cm. Find the angle between the two diagonals. What special name can you give it to this parallelogram? **[3]**

b. In the figure, ABCD is a trapezium in which DA || CB. AB has been produced to E. Find the angles of the trapezium. **[3]**
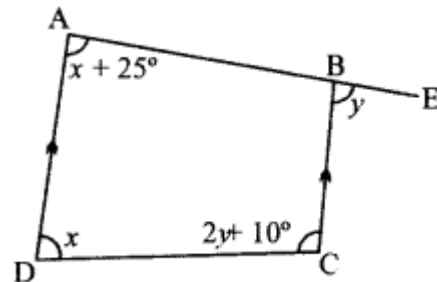
c. In the given figure, AOC is the diameter of a circle with centre O and arc A×B = 12 arc BYC. Find ∠BOC. **[4]**
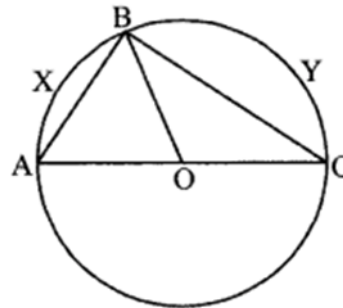
Question 6.

a. The area enclosed between the concentric circles is 770 cm². Given that the radius of the outer circle is 21 cm, calculate the radius of the inner circle.

b. Find the value of :
2√2 cos 45° cos 60° + 2√3 sin 30° tan 60° – cos 0°

c. Find a point on the Y-axis which is equidistant from the points A (6, 5) and B (- 4, 3).

Question 7.

a. Find the mean and median of the numbers:
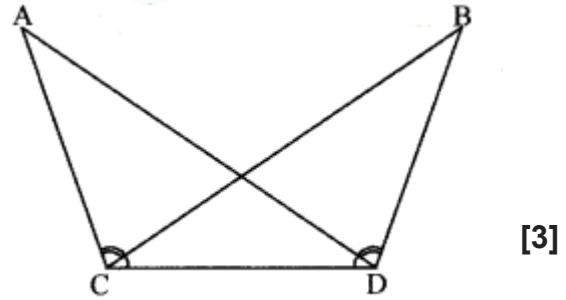41, 39, 52, 48, 54, 62, 46, 52, 40, 96, 42, 40, 98, 60, 52. **[3]**

b. In the given figure, ABCD is a trapezium. Find the values of x and y. **[3]**
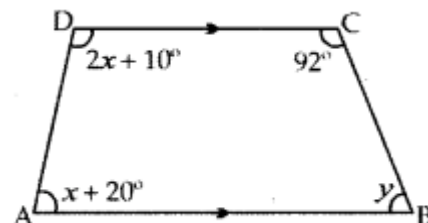
c. KM is a straight line of 13 units. If K has the coordinates (2, 5) and M has the coordinates (x, – 7), find the possible values of x. **[4]**
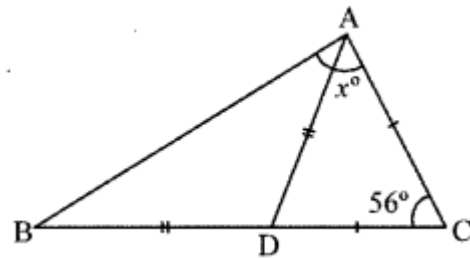
Question 8.

a. In the given figure, ∠ BCD = ∠ADC and ∠BCA = ∠ADB. Show that:

     (i)   ΔACD ≅ ΔBDC

     (ii)   BC = AD

     (iii)   ∠A = ∠B. **[3]**

b. Prove that the points A (2, 3), B (-2, 2), C (-1, -2) and D (3, – 1) are the vertices of a square ABCD. **[3]**

**c.** From the adjoining figure, find the value of x. **[4]**

Question 9.

a. If each interior angle is double the exterior angle, find the number of sides. **[3]**

b. Construct a regular hexagon of side 4.2 cm. **[3]**

c. Find the area of an isosceles triangle whose base is 6 cm and perimeter is 16 cm **[4]**

Question 10.

a. Form a cumulative frequency distribution table from the following data by exclusive method taking 4 as the magnitude of class intervals.
31, 23, 19, 29, 20, 16, 10, 13, 34, 38, 33, 28, 21, 15, 18, 36, 24, 18, 15, 12, 30, 27, 23, 20, 17, 14, 32, 26, 25, 18, 29, 24, 19, 16, 11, 22, 15, 17, 10, 25. **[3]**

b. In the given figure, ACB is a semicircle whose radius is 10.5 cm and C is a point on the semicircle at 7 cm from B.

Find the area of the shaded region. **[3]**
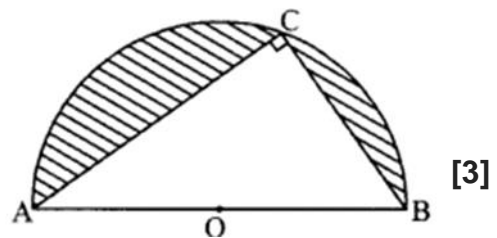
c. In the given figure, O is the centre of the circle. AB and CD are two chords of the circle. OM is perpendicular to AB and ON is perpendicular to CD. AB = 24 cm, OM = 5 cm, ON = 12 cm.

    Find   (i)   radius of the circle

           (ii)   Length of chord CD. **[4]**