Time: 1.5 Hours   **Max. Marks: 40**

General Instructions:

1. All questions are compulsory.

2. The question paper consists of five sections: A, B, C, D, and E.

3. Section A contains 8 MCQs of 1 mark each.

4. Section B contains 4 Very Short Answer questions of 2 marks each.

5. Section C contains 3 Short Answer questions of 3 marks each.

6. Section D contains 2 Long Answer questions of 5 marks each.

7. Section E contains 1 Case Study with 5 MCQs of 1 mark each.

Section A (Multiple Choice Questions)

1. The abscissa of a point is positive in:

    (a) I and II quadrants
    (b) I and IV quadrants
    (c) I quadrant only
    (d) II quadrant only

2. If the coordinates of a point are $(0, -5)$, then it lies:

    (a) On the X-axis
    (b) On the Y-axis
    (c) In the IV quadrant
    (d) In the III quadrant

3. The perpendicular distance of the point $P(4, 3)$ from the X-axis is:

    (a) 4 units
    (b) 3 units
    (c) 5 units
    (d) 7 units

4. Any point on the line $y = x$ is of the form:

    (a) (a, a)
    (b) $(0, a)$
    (c) $(a, 0)$
    (d) $(a, -a)$

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5. The point where the two axes intersect is called the origin and its coordinates are:

   (a) $(1,1)$

   (b) $(1,0)$

   (c) $(0,1)$

   (d) $(0,0)$

6. A point whose abscissa is -3 and ordinate is 2 lies in:

   (a) I quadrant

   (b) II quadrant

   (c) III quadrant

   (d) IV quadrant

7. If the y-coordinate of a point is zero, then this point always lies:

   (a) In I quadrant

   (b) In II quadrant

   (c) On X-axis

   (d) On Y-axis

8. The signs of the coordinates of a point in the III quadrant are:

   (a) $(+,+)$

   (b) $(-,+)$

   (c) $(+,-)$

   (d) $(-,-)$

Section B (Very Short Answer Questions)

1. Write the coordinates of the vertices of a rectangle whose length and breadth are 5 and 3 units respectively, one vertex at the origin, the longer side lies on the X-axis and it lies in the IV quadrant. (2)

2. In which quadrant or on which axis do each of the following points lie?
   $(-2,4), (3,-1), (-1,0), (1,2)$. (2)

3. Find the coordinates of a point which is at a distance of 4 units from the X-axis and 3 units from the Y-axis (Mention all four possible coordinates). (2)

4. If the point $P(k-1, k+2)$ lies on the Y-axis, find the value of k and the coordinates of P. (2)

Section C (Short Answer Questions)

1. Plot the points $A(2,2), B(-2,2), C(-2,-2)$ and $D(2,-2)$ on a Cartesian plane. Join them in order and identify the figure so formed. (3)

2. A point M lies on the X-axis and has abscissa -5. Another point N lies on the Y-axis and has ordinate 5. Find the coordinates of M and N. If O is the origin, find the area of the triangle MON. (3)

3. Write the coordinates of the points P, Q, R and S from the given graph:
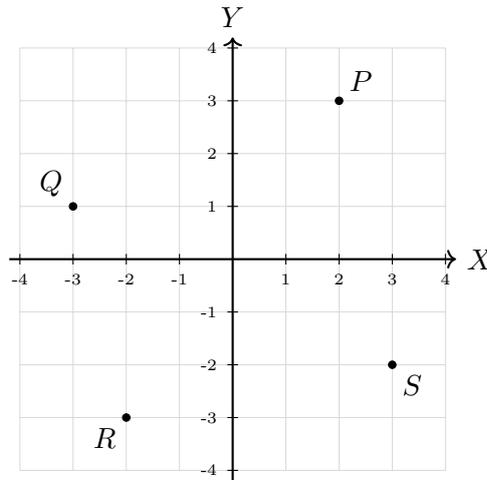
(3)

Section D (Long Answer Questions)

1. Plot the following points on the graph paper: $P(1,1), Q(2,4), R(3,1)$. Join PQ, QR and RP. (i) Name the triangle formed. (ii) Find the coordinates of the image of point Q when reflected in the X-axis. (iii) Find the coordinates of the image of point P when reflected in the Y-axis. (5)

2. Three vertices of a square are $A(1,4), B(-3,4)$ and $C(-3,0)$. (i) Plot these points on a graph. (ii) Find the coordinates of the fourth vertex D to complete the square. (iii) Find the coordinates of the point of intersection of the diagonals. (5)

Section E (Case Study Based Question)

Case Study: The Smart City Navigation

In a newly planned Smart City, the town planners used a Cartesian coordinate system to map out essential services. The central Clock Tower is located at the origin $(0,0)$. The X-axis represents the Main East-West Road, and the Y-axis represents the North-South Avenue. A famous Hospital is located at point $H(4,5)$, a Fire Station is at $F(-3,2)$, a Public Library is at $L(-2,-4)$, and a Shopping Mall is at $M(5,-3)$. To ensure quick response times, the city emergency services use these coordinates to track the locations of service vehicles. The planners realized that by understanding the quadrants, they could categorize the city into four zones: the Residential Zone (Quadrant I), the Industrial Zone (Quadrant II), the Educational Zone (Quadrant III), and the Commercial Zone (Quadrant IV). This systematic mapping helps in the efficient delivery of resources across the city.

Based on the above information, answer the following questions:

1. In which zone is the Shopping Mall $M(5,-3)$ located?

   (a) Residential Zone

(b) Industrial Zone

(c) Educational Zone

(d) Commercial Zone

2. What is the abscissa of the Fire Station?

(a) 2

(b) -3

(c) 5

(d) 0

3. Which facility is located in the Educational Zone (Quadrant III)?

(a) Hospital

(b) Fire Station

(c) Public Library

(d) Shopping Mall

4. If a Police Post is located exactly halfway between the Clock Tower and the Hospital on a straight line, but specifically on the North-South Avenue at a height of 5 units, its coordinates would be:

(a) $(5, 0)$

(b) $(0, 5)$

(c) $(4, 0)$

(d) $(0, 4)$

5. What is the perpendicular distance of the Hospital $H(4, 5)$ from the Main East-West Road (X-axis)?

(a) 4 units

(b) 5 units

(c) 9 units

(d) 1 unit