Practice Sheet
EM-I
Premier University
Topic: Circle and System of Circle

1. Define followings with figures:
   i) Circle and radius
   ii) Pole and Polar
   iii) Radical Axis
   iv) Limiting Point
   v) Coaxal System of circles
2. Find the equation of the circle passing through the following points: (5, 2), (2, 1), (1, 4).
3. Find the length of the tangent from the point (2, 3) to the circle $x^2 + y^2 + 8x + 4y + 8 = 0$.
4. Show that the circles $x^2 + y^2 - 26x - 19 = 0$ and $x^2 + y^2 + 3x - 8y - 43 = 0$ touch externally. Find the point of contact and the common tangent.
5. Find the equation of the circle passing through the point (3, 5) and (5, 3) and having its center on the line $2x + 3y - 1 = 0$.
6. Find the equation of the circle passing through the point $(-4, 3)$ and touching the lines $x + y = 2$ and $x - y = 2$.
7. Find the condition for two circles to be orthogonal.
8. Find the limiting points of the co-axal system determined by the circle $x^2 + y^2 + 2x + 4y + 7 = 0$ and $x^2 + y^2 + 4x + 2y + 5 = 0$.
9. Find the radical axis of the circles $x^2 + y^2 - 4x - 2y - 11 = 0$ and $x^2 + y^2 - 2x - 6y + 1 = 0$ and show that the radical axis is perpendicular to the line of centers.
10. Show that the circle $x^2 + y^2 - 8x - 6y + 21 = 0$ is orthogonal to the circle $x^2 + y^2 - 2y - 15 = 0$. Find the common chord and the equation of the circle passing through the centers and intersecting points of the circles.