Unit-4: Coordinate Geometry

4.	**L29 TO L36**	**Coordinate Geometry** **Course Outcome (CO d):** Solve basic engineering problems under given conditions of straight line lines and circle.
	29	Reorientation: Distance formula for R2, Centroid of a triangle, Circum center, Midpoint of line segment, locus of point, Area of triangle, co linearity of three points. Distance Formulae: Let A(x1, y1) and B(x2, y2) be the points of R2 then distance between A and B is given by d(A,B) = $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} = \overline{AB}$ Centroid: Let A(x1, y1) ,B(x2, y2) and C(x3, y3) forms the triangle then the centroid is given by the G $\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right)$ Examples on distance formulae & centroid of triangle
	30 To 32	Equation of straight line passing through two points (x_1, y_1) and (x_2, y_2) ➢ Slope (m): If θ is the angle made by the line with the + ve X- axis then tanθ is known as slope of the line and θ is known as inclination of the line. Slope m = $\frac{y_2 - y_1}{x_2 - x_1}$ ➢ Two point form : $\frac{y - y_1}{x - x_1} = \frac{y_2 - y_1}{x_2 - x_1}$ Equation of straight line having an intercept ‘c’ on y-axis and slope ‘m’ Slope intercept form: y= mx + c, c is a y-intercept Two intercept form: $\frac{x}{a} + \frac{y}{b} = 1$, a & b are intercept on x & Y axis respectively. Examples on above equations
	33	Equation of straight line having slope m and passing through two points (x_1, y_1). Slope point form: $(y-y_1) = m(x-x_1)$ Parallel and perpendicular straight lines, relation between their slopes. ➢ Parallel lines → $m_1 = m_2$ ➢ Perpendicular lines → $m_1 m_2 = -1$

	34	Perpendicular distance 'P' from a fixed point (x_1, y_1) of a line is $p = \left\lvert \frac{ax_1 + by_1 + c}{\sqrt{a^2 + b^2}} \right\rvert$ ➢ Expression for angle between two lines with slope m_1 & m_2 is $\tan\theta = \left\lvert \frac{m_1 - m_2}{1 + m_1 m_2} \right\rvert$ Examples on above topic
	35 TO 36	Equation of circle having its center at (h, k) and radius r General equation of circle Equation of a circle with centre (h, k) and radius r is $(x-h)^2 + (y-k)^2 = r^2$. If the equation of a circle is $x^2 + y^2 + 2gx + 2fy + c = 0$. then centre of the circle is = (-g, -f) & Radius r = $\sqrt{g^2 + f^2 - c}$ Examples of equation of circle

Unit - 04 Cordinate Geometry

Course Outcome: CO d) Solve basic engineering problems under given conditions of straight line lines and circle.

Question for Mark 01

1) Slope of line passing through points A (5, 7) and B (2, 1) is______

(a) 3 (b) 2 (c) 4 (d) 1/2

2) Slope of line making an angle $\frac{\pi}{3}$ with positive direction of x- axis is ________

(a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) $\frac{1}{\sqrt{2}}$

3) Slope of line $2x + 3y - 6 = 0$ is ___________ .

(a) 2/3 (b) 3/2 (c) -2/3 (d) -3/2

4) Slope of line $3y - 4 = 0$ is ___________

(a) 0 (b) $\frac{3}{4}$ (c) 1 (d) $-\frac{3}{4}$

5) Slope of line parallel to the line $3x + 4y + 7 = 0$ is_________

(a) 4/3 (b) 7/4 (c) 4/7 (d) -3/4

6) Slope of line perpendicular to the line $5x - 7y + 3 = 0$_________

(a) 5/7 (b) 7/5 (c)-7/5 (d) 7/3

7) x-intercept of line $2x + 3y - 4 = 0$ is _______________

(a) -2 (b) 2 (c) 4/3 (d) 1/2

8) y-intercept of line $3x - 5y + 8 = 0$ is___________

(a) -8/3 (b) 8/5 (c) 5/8 (d) 3/5

9) The perpendicular distance from the origin to the line $3x + 4y - 8 = 0$ is ________

(a) 8 (b) $\frac{8}{25}$ (c) 4 (d) $\frac{8}{25}$

10) Equation of line passing through the origin and having slope $\frac{1}{2}$ is ________

(a) 2y = x (b) 2y = -x (c) x = 2y (d) x = -2y

11) Centre of circle $x^2 + y^2 = 16$ is____

(a) (1, 1) (b) (0, 0) (c) (4, 4) (d) (4, 0)

12) Radius of circle $x^2 + y^2 = 9$ is____

(a) 2 (b) 0 (c) 3 (d) Not Defined

13) Equation of circle having centre (0,0) and radius 3 unit is_____________

(a) $x = 3$ (b) $x^2 + y^2 = 0$ (c) $x^2 + y^2 = 9$ (d) $x + y = 3$

- **Question for Mark 03**

1) Show that the points $(a, b + c)$, $(b, c + a)$ and $(c, a + b)$ are collinear

2) Find k If the points $(–k, 1)$, $(k, 3)$ and (6, 5) are collinear — $k = 2$

3) Find the equation of a line passing through (2, 3) and (3, -1). What is the slope? — $4x + y - 11 = 0$, $m = -4$

4) Show that the two lines $7x + y – 1 = 0$ and $21x + 3y + 2 = 0$ are parallel.

5) Show that the two lines $7x + y – 1 = 0$ and $3x - 21y + 2 = 0$ are perpendicular.

6) If two lines $8x - 5y + 3 = 0$ and $2x + ky + 2 = 0$ are parallel then find k. — $k = -5/4$

7) Two lines $4x – ky = 0$ and $-3x - 7y + 1 = 0$ are perpendicular then find k. — $k = 12/7$

8) If the slope of the line $kx – 5y = 7$ is 4 then find k. — $k = 20$

9) Find the equation of line passing through the point (4, 3) and parallel to the line $x + 5y + 3 = 0$. — $x + 5y – 19 = 0$

10) Find centre and radius of the circle $4x^2 + 4y^2 + 8x - 12y - 3 = 0$ — (-1, 3/2), 2

11) Find centre and radius of the circle $36x^2 + 36y^2 + 24x - 36y - 23 = 0$ — (-1/3, 1/2), 1

12) Find the equation of the circle passing through (7, -2) and having centre (4, 3). — $x^2 + y^2 - 8x - 6y - 9$

13) Find the equation of the circle which is passing through the point (-2, 5) and having the equations of the diameters $2x + y - 3 = 0$ and $x – 3y + 2 = 0$. — $x^2 + y^2 - 2x - 2y - 23 = 0$

14) Find the equation of the circle passing through (-7, 1) and having centre origin. — $x^2 + y^2 = 50$

15) Find the equation of the circle passing through the points (4, 0) (0, 4) and (0, 0). $x^2 + y^2 - 4x - 4y = 0$

- **Question for Mark 04**

1) Find the equation of a line passing through (3, 4) and (i) Parallel & (ii) perpendicular to the line $3y - 2x = 1$. $2x - 3y + 6 = 0$, $3x + 2y - 17 = 0$

2) Find the equation of line passing through the point (4, 3) and perpendicular to the line $4y - 3x + 7 = 0$. $4x + 3y - 25 = 0$

3) Find the equation of line passing through the intersection of the lines $x - y = 7$ and $2x + y = 11$ and perpendicular to the line $3x - 4y = 7$. $4x + 3y - 21 = 0$

4) Find the equation of line passing through the intersection of the lines $x - y = -1$ and $3x + 4y = 5$ and parallel to the line $5x + y = 1$.

5) If A (5, 4) and B (-2, 0) are two points then find perpendicular bisector of line segment *AB*. $14x + 8y - 37 = 0$

6) Find equation of the tangent and the normal to the circle $x^2 + y^2 - 2x + 4y - 20 = 0$ at the point (-2, 2). $3x - 4y + 14 = 0$, $4x + 3y + 2 = 0$

7) Find the equation of the tangent and the normal to the circle $x^2 + y^2 - 2y - 7 = 0$ at the point (2, 3). $x + y - 5 = 0$, $x - y + 1 = 0$