



United International University
School of Science and Engineering
 Mid Term Exam Trimester: Fall 2022
 Course Title: Coordinate Geometry and Vector Analysis
 Course Code: Math 2201 Marks: 30
 Total Time: 1 hour and 45 minutes

Answer all questions.

1. a) Identify the type of Conic. [5]

$$2\sqrt{2}x^2 + 5\sqrt{2}xy + 2\sqrt{2}y^2 + 18x + 18y + 36\sqrt{2} = 0$$

Or

Sketch the graph of the Conic

$$4x^2 + 2y^2 + 18x - 2y - 50 = 0.$$

- b) Find an equation for the conic that has its vertex at $(4, 3)$ and its focus at $(4, 7)$. [3]

2. a) Determine whether or not the given lines are skew

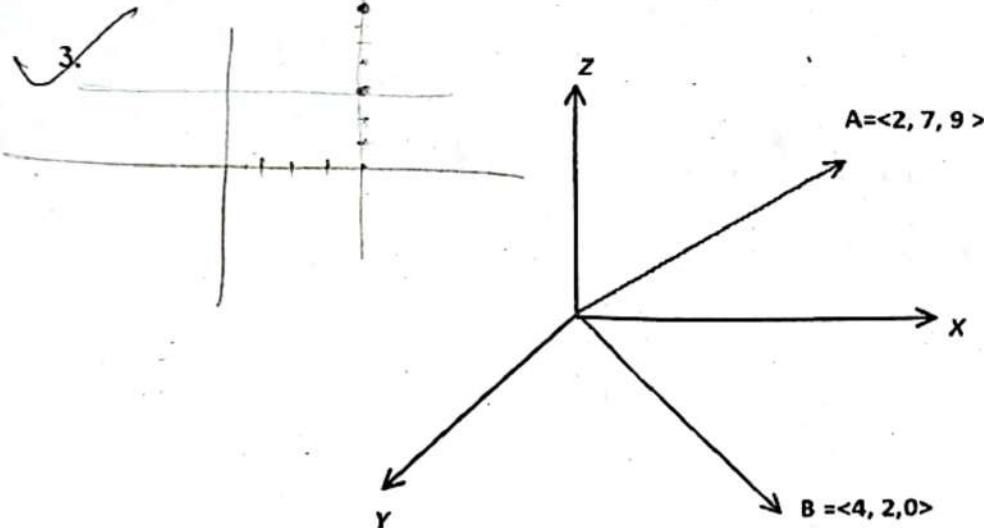
$$L_1: x = 2 - t, y = -1 + 2t, z = -1 - 5t$$

$$L_2: x = -t, y = 5 - 5t, z = 3 + 2t$$

- b) Find the equation of line of intersection of the planes

$$x + y + z - 5 = 0 \text{ and } 5x - 2y + 4z = 7.$$

[6]



- a) Find the orthogonal projection of B along A .
 b) Find the angle between vector A and y -axis.
 c) Find a unit vector that is orthogonal to vector A and x -axis.

4. a) Find the area of the triangle with vertices $P_1(-1, 4, 0)$, [3]

$$P_2(-2, 0, -1) \text{ and } P_3(1, -2, 0).$$

- b) Find the equation of the plane passing through the points [3]

$$p_1(1, 0, 3), p_2(0, 1, -2) \text{ and } p_3(-2, 1, 0).$$

- c) Find the distance between two planes $2x + 3y - z = 2$ and [2]

$$4x + 6y - 2z = 5$$

$5(5-y) - 2y = 7$
 $\Rightarrow 25 - 5y - 2y = 7$
 $25 - 7y = 7$
 $18 = 7y$
 $y = \frac{18}{7}$