

Name: SOLUTIONS

Student ID: \_\_\_\_\_

## Quiz 10

**Question 1.** (4 marks) Find the equation of the plane passing through the point  $P(3, 6, -4)$  and with normal vector  $\vec{n} = (5, 2, -1)$ .

$$5x + 2y - z + d = 0$$

$$5(3) + 2(6) - (-4) + d = 0$$

$$d = -31$$

$$\therefore \boxed{5x + 2y - z - 31 = 0}$$

**Question 2.** (2 marks) Find the equation of the line through the point  $P(-6, 3, 2)$  and parallel to the vector  $\vec{v} = (-2, -1, 0)$ .

$$(x, y, z) = (-6 - 2t, 3 - t, 2) \quad t \in \mathbb{R}$$

**Question 3.** (4 marks) Determine whether the planes  $2x - y + 4z - 7 = 0$  and  $-x + 5y - z + 1 = 0$  are perpendicular.

$$\vec{n}_1 = (2, -1, 4) \quad \vec{n}_2 = (-1, 5, -1)$$

$$\vec{n}_1 \cdot \vec{n}_2 = -2 - 5 - 4 = -11 \neq 0$$

$\therefore \vec{n}_1$  AND  $\vec{n}_2$  ARE NOT PERPENDICULAR

$\therefore$  THE PLANES ARE NOT PERPENDICULAR.