AF-IAST Skilling Pakistan	**PAK-AUSTRIA FACHHOCHSCHULE: INSTITUTE OF APPLIED SCIENCES AND TECHNOLOGY**
Assignment 1 – Fall 2025	**Deadline: 15/ 09/ 2025**
Program: CS(Green) & AI(Yellow, Red, Blue)-2025	
Course Title: Linear Algebra	**Course Code:** MTH-204
Section: F, G, H, I	**Max Marks:** 10

Problem 1.

In each part, determine whether the equation is linear in x_1, x_2, and x_3.

(a) $x_1 + 5x_2 - \sqrt{2}x_3 = 1$

(b) $x_1 + 3x_2 + x_1x_3 = 2$

(c) $x_1 = -7x_2 + 3x_3$

(d) $x_1^{-2} + x_2 + 8x_3 = 5$

(e) $x_1^{3/5} - 2x_2 + x_3 = 4$

(f) $\pi x_1 - \sqrt{2}x_2 = 7^{1/3}$

Also if not linear then write the reason why it is not linear equation.

Problem 2.

► In each part of Exercises 5–6, find a linear system in the unknowns $x_1, x_2, x_3, \ldots,$ that corresponds to the given augmented

(a) $\begin{bmatrix} 0 & 3 & -1 & -1 & -1 \\ 5 & 2 & 0 & -3 & -6 \end{bmatrix}$

(b) $\begin{bmatrix} 3 & 0 & 1 & -4 & 3 \\ -4 & 0 & 4 & 1 & -3 \\ -1 & 3 & 0 & -2 & -9 \\ 0 & 0 & 0 & -1 & -2 \end{bmatrix}$

Problem 3. Determine the given system of Linear equations is consistent?

$$\begin{aligned} x_1 \qquad\qquad - 2x_4 &= -3 \\ 2x_2 + 2x_3 \qquad &= 0 \\ x_3 + 3x_4 &= 1 \\ -2x_1 + 3x_2 + 2x_3 + x_4 &= 5 \end{aligned}$$

Problem 4. Solve the system of Linear equations by

a. Gauss Elimination method
b. Gauss-Jordan method

$$\begin{aligned} x_1 + x_2 + 2x_3 &= 8 \\ -x_1 - 2x_2 + 3x_3 &= 1 \\ 3x_1 - 7x_2 + 4x_3 &= 10 \end{aligned}$$