LAHORE UNIVERSITY OF MANAGEMENT SCIENCES
Department of Electrical Engineering

AI 501 Mathematics for Artificial Intelligence
Quiz 05 Solutions

Name: _____

Campus ID: _____

Total Marks: 10
Time Duration: 10 minutes

Question 1 (8 marks)

Consider the confusion matrix values shown for different algorithms in Table 1. For the given True Positives (TP), True Negatives (TN), False Positives (FP) and False Negatives (FN), calculate the accuracy and F1-score for each algorithm.

Table 1: Summary of Results

Algorithm	**TP**	**TN**	**FP**	**FN**	**Acc(%)**	**F1**
K-Nearest Neighbor (K = 3)	09	10	00	02		
K-Nearest Neighbor (K = 5)	07	10	00	04		
K-Nearest Neighbor (K = 7)	06	09	01	05		

Solution: The computed values are given in the table below

Algorithm	**TP**	**TN**	**FP**	**FN**	**Acc(%)**	**F1**
K-Nearest Neighbor (K = 3)	09	10	00	02	90.5	90
K-Nearest Neighbor (K = 5)	07	10	00	04	80.0	78
K-Nearest Neighbor (K = 7)	06	09	01	05	71.0	68

Question 2 (2 marks)

Which value of K gives the best performance for a KNN classifier in terms of accuracy, and explain why this value outperforms KNN classifiers with other values of K based on your answer.

Solution: K=3. Best trade-off between noise-sensitivity (low-k) and feature-space-capture (high-k). Reflective in higher accuracy at K=3.