Jordan University of Science and Technology
Faculty of Computer Science & Information Technology
Computer Science Department
AI 249- Machine Learning/ First Exam Spring 2024/2025

Name: **id:**

CLO1: Understand and explain key machine learning concepts and algorithms. [1SO1] [1L7K1]

Section 1: Multiple Choice Questions (MCQ) (out of 4)

1	2	3	4	5	6	7	8

Section 2: True and False Questions (T/F) (out of 4)

1	2	3	4	5	6	7	8

Section 3: Fill in the Blanks (Mathematics-Based) (out of 2)

1	2	3	4

Section 1: Multiple Choice Questions (MCQ)

Instructions: Choose the **one** correct answer for each question.

1. **What is the primary purpose of the Mean Squared Error (MSE)?**
   A) To increase accuracy of classification models
   B) To measure the variance of data
   C) To quantify the difference between predicted and actual values
   D) To determine the correlation between two variables
2. **What is the primary goal of regression in machine learning?**
   A) To classify data into discrete categories
   B) To determine relationships between continuous variables
   C) To reduce the dimensionality of data
   D) To cluster similar data points
3. **What is the main purpose of a loss function in machine learning?**
   A) To determine how well a model performs
   B) To store the dataset efficiently
   C) To increase computation speed
   D) To remove features from the dataset
4. **What is Machine Learning?**
   A) A method for explicitly programming computers to perform tasks
   B) A study of algorithms that improve with experience
   C) A way to replace all human decision-making
   D) A new version of Artificial Intelligence that does not require data
5. **Which of the following is an example of supervised learning?**
   A) Grouping customers based on purchase behavior
   B) Training a model with labeled cat and dog images
   C) Allowing an AI agent to learn by trial and error
   D) Creating clusters of unknown data
6. **What is the term used for splitting data into training and testing sets?**
   A) Overfitting
   B) Underfitting
   C) Cross-validation
   D) Regularization
7. **Which of the following is a qualitative data type?**
   A) Temperature readings
   B) A person's eye color
   C) The height of students in a classroom
   D) The weight of objects
8. **In probability, what is the sum of all probabilities of all possible outcomes?**
   A) 0
   B) 1
   C) Infinity
   D) Depends on the dataset

Section 2: True and False Questions (T/F)

1. The median is always affected by extreme values or outliers. Answer: F
2. Linear algebra is important in machine learning because it helps with handling matrices and vectors. Answer: T
3. The range of a dataset is defined as the difference between the highest and lowest values. Answer: T
4. A correlation coefficient of -1 means two variables are perfectly positively correlated. Answer: F
5. The interquartile range (IQR) measures the variability within the middle 50% of a dataset. Answer: T
6. Probability distributions are only useful for discrete variables, not continuous ones. Answer: F
7. A model with high bias is likely to underfit the training data. Answer: T
8. In regression, the dependent variable Y must always be continuous. Answer: T

Section 3: Fill in the Blanks (Mathematics-Based)

1. The mean (average) of the numbers 10, 20, 30, 40, and 50 is:
Answer: 30

2. If P(A) = 0.3 and P(B) = 0.5, then the probability of both occurring together (if independent) is:
Answer: 0.15 (P(A) × P(B))

3. The probability of rolling a 3 on a fair six-sided die is:
Answer: 1/6

4. For a confusion matrix with the following values:
    - True Positives (TP) = 8
    - False Positives (FP) = 2
    - True Negatives (TN) = 10
    - False Negatives (FN) = 5

    Calculate the precision.
    Correct Answer: Precision = TPTP+FP=88+2=0.8*TP*+*FPTP*=8+28=0.8

Correct Answer: Precision = $\frac{TP}{TP+FP} = \frac{8}{8+2} = 0.8$