JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST - 1 EXAMINATION - 2025

B.Tech. - VI Semester (BI)

COURSE CODE (CREDITS): 18B11BI611 (3) MAX. MARKS: 15

COURSE NAME: Machine Learning for Bioinformatics

COURSE INSTRUCTORS: D. Gupta MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory. (b) The candidate is allowed to make suitable numeric assumptions wherever required for solving problems. (c) Use of calculator is allowed. (d) Be concise.*

Q. No.	Question	CO	Marks
Q1(a)	What are the main challenges encountered in developing machine learning applications? Discuss the key difficulties and their potential solutions.	1	2
(b)	What are the fundamental differences between supervised, unsupervised, and reinforcement learning in terms of their objectives, data requirements, and real-world applications?	1	3
Q2 (a)	A machine learning model predicts animals, Cat, Dog and Rabbit on the basis of their behavior. Using the following confusion matrix, compute Recall, Accuracy and Precision for Cat class:	3	3
(b)	What is ROC AUC (receiver operating characteristic area under curve) and why is it considered a useful metric for evaluating classification models, especially for imbalanced datasets?	3	2
Q3 (a)	In linear regression, what is the total sum of residuals for a given dataset? Additionally, derive the formulas for the regression coefficients β_0 (intercept) and β_1 (slope) by minimizing the sum of squared residuals.	2	3
(b)	What is gradient descent? Outline the step-by-step process for finding the local minimum of a differentiable function in the case of a regression line.	2	2

		Predicted		
		Cat	Dog	Rabbit
Actual	Cat	10	2	1
	Dog	1	8	1
	Rabbit	2	1	9