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B.E. Semester VI EXAMINATION APRIL 2025

Subject Code: CT 604E-N SubjectName :Machine Learning

Time : 12:30 TO 3:30 P.M. Date: 12/04/2025Max. Marks : 70

Instructions: 1) All questions are **compulsory**.
2) Figures to the **right** indicate full marks.
3) Use of scientific calculator is permitted.
4) Indicate **clearly**, the options you attempt along with its respective question number.
5) Use the last page of main supplementary for **rough work**

SECTION-1

Q.1	(a)	Define Machine learning? Briefly explain the types of learning.	[5]
	(b)	What is categorical data? Explain its types with examples.	[5]
	(c)	What is Bernoulli distribution? Explain briefly with its formula.	[5]
		OR	
	(c)	How can we take care of outliers in data? Explain.	[5]
Q.2	(a)	Explain Decision Tree as classification method.	[5]
	(b)	Explain Gradient descent algorithm in the context of linear regression.	[5]
		OR	
Q.2	(a)	List the methods for Model evaluation. Explain each.	[5]
	(b)	Draw and explain the flow diagram of machine learning procedure.	[5]
Q.3	(a)	Explain Bais-Variance trade-off.	[5]
	(b)	Discuss the error rate and validation error in the KNN algorithm.	[5]
		OR	
Q.3	(a)	Explain Hidden Markov chain model	[5]
	(b)	Draw a flow chart which represents backpropagation algorithm.	[5]

SECTION-2

Q.4	(a)	Differentiate PCA and LDA.	[5]
	(b)	Explain how Naïve Bayes classifier is used for Spam Filtering.	[5]
	(c)	What is ensemble technique? Explain bagging using suitable example.	[5]
		OR	
	(c)	Explain K-fold cross validation method with suitable example.	[5]

Q.5 (a) Consider the following confusion matrix of identifying the email as spam or not spam. Calculate model accuracy, Recall, Precision and F1 score for the same. [5]

	Predicted Spam	Predicted Not Spam
Actual Spam	60	20
Actual Not Spam	20	100

(b) What is Clustering? Explain K-mean clustering algorithm. [5]

OR

Q.5 (a) What are the factors determining the effectiveness of SVM? [5]

(b) Explain reinforcement learning in detail. [5]

Q.6 (a) Discuss TWO applications of machine learning in detail [5]

(b) Explain posterior probability with its formula. [5]

OR

Q.6 (a) Define: a. Supervised Learning b. Classification c. Regression d. covariance f. Joint probability [5]

(b) What is principal component analysis? How does it work? Explain. [5]

ALL THE BEST