	ADAMAS UNIVERSITY		
	END-SEMESTER EXAMINATION : JANUARY 2021		
	(Academic Session: 2020 – 21)		
Name of the Program: (Example: B. Sc./BBA/MA/B.Tech.)	B.TECH	**Semester:** (I/III/ V/ VII/IX)	V
Paper Title :	ELECTIVE – I (MACHINE LEARNING)	**Paper Code:**	ECS43109
Maximum Marks :	40	**Time duration:**	3 HRS
Total No of questions:	8	**Total No of Pages:**	2
(Any other information for the student may be mentioned here)	1. Answer should be to the point 2. Non-contextual answer doesn't carry any marks		

Answer all the Groups
Group A
Answer all the questions of the following $5 \times 1 = 5$

1. **a)** In which field of Computer Science, Machine Learning is a subset?
   b) Why Support Vector Machine (SVM) is called maximum margin classifier?
   c) Write two application of Gaussian Mixture Model (GMM).
   d) How many layers are required for implementing XOR Logic using Artificial Neural Network (ANN)?
   e) Which type of graph resembles the connection between layers of an ANN?

GROUP –B
Answer *any three* of the following $3 \times 5 = 15$

2. What is the meaning of support and vectors in SVM? Explain both of them with a neat diagram.

3. In Decision Tree, one need to decide the feature to expand a particular branch. What is the method of selecting a particular feature among all the features of a dataset explain with an example?

4. Consider the following table containing training example for binary classification. Using K-Nearest Neighbour approach, predict the class for the test example, T= {Home Owner=No, Marital Status= Married, Income=25000}. Assume K=3 =, and distance if Euclidean.

Home Owner	Marital Status	Annual Income	Defaulted Borrower
Yes	Single	125K	No
No	Married	100K	No
No	Single	70K	No
Yes	Married	120K	No
No	Divorced	95K	Yes
No	Married	60K	No
Yes	Divorced	220K	No
No	Single	85K	Yes
No	Married	75K	No
No	Single	90K	Yes

5. What is Bias and Variance of a classifier? How do these two make impact on classification?

GROUP –C

Answer *any two* of the following $2 \times 10 = 20$

6. Draw multiple layer ANN (with 1 hidden layer) with all the notations. Derive an equation of gradient descent rule to minimize the error.

7. The following table gives the dataset about stolen vehicles. Using Naïve Bayes Classifier classify the test data as T={Color=Red, Type=SUV, Origin=Domestic)

COLOR	TYPE	ORIGIN	STOLEN
RED	SPORTS	DOMESTIC	YES
RED	SPORTS	DOMESTIC	NO
RED	SPORTS	DOMESTIC	YES
YELLOW	SPORTS	DOMESTIC	NO
YELLOW	SPORTS	IMPORTED	YES
YELLOW	SUV	IMPORTED	NO
YELLOW	SUV	IMPORTED	YES
YELLOW	SUV	DOMESTIC	NO
RED	SUV	IMPORTED	NO
RED	SPORTS	IMPORTED	YES

8. Write short notes on: i) Hidden Markov Model, and ii) Binomial Distribution in Bayes Classifier.

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