	Reg. No.										
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	B.E. / B.Tech DEGREE EXAMINATIONS, NOV / DEC 2024										
	Sixth Semester										
	<b>Electronics and Communication Engineering</b>										
	20ECEL609 - MACHINE LEARNING TECHNIQUES										
	Regulations - 2020										
Du	-	. Mar	ks: 1	00							
	$\mathbf{D} \mathbf{A} \mathbf{D} \mathbf{T} = \mathbf{A} \left( \mathbf{M} \mathbf{C} \mathbf{O} \right) \left( 20 \times 1 - 20 \mathbf{M} \mathbf{a} \mathbf{r} \mathbf{h} \mathbf{r} \right)$										
	Answer ALL Questions	Marks	Level	СО							
1.											
	(a)Support Vector Machine (b) K-means Clustering										
	(c) Decision Trees (d) Linear Regression										
2.	In supervised learning, the algorithm learns from a labelled set.	1	K1	<i>CO1</i>							
2	(a) testing (b)validation (c) training (d) evaluation	1	V I	<i>c</i> 01							
3.	You are building a model to predict the number of customer purchases. What type of numerical data is this?	1	K1	<i>CO1</i>							
	(a) Continuous numerical (b) Discrete Numerical Data										
	(c) Ordinal data (d) Nominal data										
4.	What is the primary goal of the Find-S algorithm?	1	K1	<i>CO2</i>							
	(a) To find the most specific hypothesis (b) To find the most general hypothesis										
	(c) To create a decision tree (d) To optimize the hypothesis space										
5.	Which of the following algorithms uses both positive and negative examples?	1	K1	<i>CO2</i>							
	(a) Find-S (b) Candidate Elimination (c) List-Then-Eliminate (d) Perceptron										
6.	The inductive bias of the Candidate Elimination algorithm assumes that:	1	K1	<i>CO2</i>							
	(a) The target concept is within the hypothesis space										
	(b) The hypothesis space is infinite										
	(c) Only positive examples define the target concept										
7.	(d) The target concept is not in the hypothesis space Which of the following best describes a perceptron?	1	K1	CO3							
/.	(a) A linear classifier used in supervised learning										
	(b) A neural network with multiple hidden layers										
	(c) An unsupervised learning algorithm										
	(d) A genetic algorithm for optimization										
8.	Which of the following statements is true about genetic algorithms?	1	K1	CO3							
	(a) They rely on gradient-based optimization										
	(b) They mimic natural selection and evolution										
	<ul><li>(c) They are used only for classification tasks</li><li>(d) They cannot be used for continuous data</li></ul>										
9.	What is the role of mutation in genetic algorithms?	1	K1	CO3							
).	(a) To speed up convergence (b) To introduce diversity into the population										
	(c) To minimize the fitness function (d) To reinforce the current solution										
10.	Bayes' theorem is used to calculate	1	K1	<i>CO</i> 4							
	(a) Conditional probability (b) Marginal probability										
	(c) Joint probability (d) All of the above										
11.	The Bayes optimal classifier is based on	1	K1	<i>CO</i> 4							
	(a) A decision tree algorithm (b) A nearest-neighbor approach										
	(c) The likelihood of different hypotheses (d) A probabilistic approach to classification										

(a) Estimate model parameters via sampling (b) Compute the Bayes optimal classifier (c) Find the most likely hypothesis in a Bayesian network (d) Generate random variables for the likelihoad computationImage: Computation13. The K-NN algorithm is classified under which type of learning (e) Reinforcement learning (f) Deep learning (f) Deep learning (f) By averaging all data points (h) By the majority class among the K-nearest neighbours (f) By randomly choosing a classImage: KI COS (f) By averaging all data points (f) By randomly choosing a classImage: KI COS (f) By andomly choosing a classImage: KI COS (f) By randomly responsional logic (f) Dimension valuesImage: KI COS (f) COS (f) COS (f) Dimension valuesImage: KI COS (f) COS (f) COS (f) COS (f) COS (f) COS (f) COS (f) COS 	12.	Gibbs sampling is used to	1	K1	<i>CO</i> 4	
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		b) Explain in detail Supervised. Unsupervised and Reinforcement learning with	10	K2	<i>CO1</i>	

32. a) Explain the Find-S algorithm in detail. Describe its steps, use cases, and limitations 10 K2 CO2 in machine learning. Provide an example to illustrate how it works.

OR

Day	Outlook	Temperature	Humidity	Wind	<b>Play Tennis</b>
1	Sunny	Hot	High	Weak	No
2	Sunny	Hot	High	Strong	No
3	Overcast	Hot	High	Weak	Yes
4	Rain	Mild	High	Weak	Yes
5	Rain	Cool	Normal	Weak	Yes
6	Rain	Cool	Normal	Strong	No
7	Overcast	Cool	Normal	Strong	Yes
8	Sunny	Mild	High	Weak	No
9	Sunny	Cool	Normal	Weak	Yes
10	Rain	Mild	Normal	Weak	Yes
11	Sunny	Mild	Normal	Strong	Yes
12	Overcast	Mild	High	Strong	Yes
13	Overcast	Hot	Normal	Weak	Yes
14	Rain	Mild	High	Strong	No

b) Draw and solve the decision trees for the following set of training examples



- 33. a) Explain the working of the perceptron algorithm as a linear classifier with its 10 K2 CO3 limitations.
  - OR
  - b) Discuss evolutionary models and their application in machine learning. 10 K2 CO3
- 34. a) Describe how Bayes Theorem can be used to update the probability of a hypothesis 10 K2 CO4 based on new evidence in a concept learning context.

OR

- b) Describe the Gibbs Algorithm and its significance in relation to the Bayes Optimal 10 K2 CO4 Classifier.
- 35. a) Explain the K-Nearest Neighbor (K-NN) algorithm, including its working principles, <sup>10</sup> K2 CO5 advantages and limitations.

## OR

- b) Assess the detail about distance-weighted nearest neighbour algorithm. 10 K2 CO5
- 36. a) Explain the Sequential Covering Algorithm and its significance in learning sets of <sup>10</sup> K2 CO6 rules. Evaluate its advantages and limitations in rule generation with an example.

## OR

b) Explain the Explanation-Based Learning (EBL) approach and its role in optimizing <sup>10</sup> K2 CO6 the learning process.