

G. Narayanamma Institute of Technology & Science**(Autonomous)****(for Women)**

Shaikpet, Hyderabad- 500 104

III-B.Tech II-Semester Regular/Supplementary Examinations, June - 2023**MACHINE LEARNING****(Common to CSE & CST)****Max. Marks: 70****Time: 03 Hours****Note:**

1. Question paper comprises of **Part A** and **Part B**.
2. **Part A** is compulsory which carries 10 marks. Answer all questions in Part A.
3. **Part B** (for 60 marks) consists of **five questions** with **“either” “or”** pattern. Each question carries 12 marks and may have a,b,c as sub questions. The student has to answer any one full question.

PART-A*(Answer 05 questions. Each question carries 2 marks)*

Q.No.	Question	Marks	CO	B L
Q.1	a) What are the advantages and limitations of using a version space for concept learning?	[02]	CO1	[L1]
	b) Explain the principle of Occam's razor and its significance in scientific reasoning.	[02]	CO3	[L2]
	c) What is the basic idea behind the Minimum Description Length (MDL) Principle?	[02]	CO3	[L2]
	d) Give two examples of explanation-based learning.	[02]	CO1	[L1]
	e) What is the role of a fitness function in evolutionary algorithms or genetic algorithms?	[02]	CO6	[L3]

END OF PART A**PART-B***(Answer 05 full questions. Each question carries 12 marks)*

Q.No.	Question	Marks	CO	B L
Q.2(a)	Given a set of training examples and a target concept, can you design and implement an appropriate algorithm or approach to learn the concept, and evaluate its performance on unseen test examples.	[06]	CO4	[L3]
(b)	Compare supervised and unsupervised learning. Give an example for each.	[06]	CO5	[L4]
OR				
Q.3(a)	Given a specific machine learning task such as regressing the cost of house, can you analyze the problem requirements and design an appropriate inductive bias that guides the learning process and improves generalization performance.	[06]	CO4	[L3]
(b)	Explain Reinforcement Learning. Give a block diagram to describe the process.	[06]	CO5	[L2]

Q.4(a)	A dataset has two features - height in centimeters and weight in kilograms. The output of gender is label - male or female. The following is the skeleton of a binary decision tree: If Height > 186 cm Then Male If Height <= 186 cm AND Weight > 85 kg Then Male If Height <= 186 cm AND Weight <= 85 kg Then Female Make Predictions. Draw a Decision Tree for the above rule-based condition. What are the conditions used to construct a DT and choose the root node.	[06]	CO6	[L4]
(b)	Discuss strengths and limitations of Perceptron.	[06]	CO4	[L2]
OR				
Q.5(a)	Explain the concept of inductive bias in decision tree learning and how it influences the construction and generalization of the resulting decision tree.	[06]	CO3	[L2]
(b)	Draw the multilayer neural network with input layer, hidden layer(s), and output layer, and label the components of each layer. Analyze the importance of activation function in each layer.	[06]	CO4	[L4]
Q.6(a)	Explain sample complexity for infinite hypothesis spaces.	[06]	CO2	[L3]
(b)	Explain the basic steps of the EM algorithm, including the E-step (Expectation step) and M-step (Maximization step) and its purpose in machine learning.	[06]	CO2	[L2]
OR				
Q.7(a)	Demonstrate the basic idea of how a Naive Bayes classifier works for text classification. Take a suitable example.	[06]	CO6	[L3]
(b)	What is mistake bound model formula in mathematical terms and its purpose in machine learning algorithm?	[06]	CO6	[L1]
Q.8(a)	Explain K-nearest neighbor algorithm using diagram, its purpose. Is it a lazy learner.	[06]	CO6	[L2]
(b)	Demonstrate PROLOG-EBG as Explanation Based Learning. Summarize its key aspects.	[06]	CO4	[L3]
OR				
Q.9(a)	Compare and contrast eager and instance-based learning. Give one examples for each.	[06]	CO4	[L2]
(b)	Define Perfect Domain Theory and its various aspects.	[06]	CO1	[L1]
Q.10(a)	Define Genetic Algorithm in your own words with examples.	[06]	CO1	[L1]
(b)	Explain the process of crossover and mutation in a Genetic Algorithm.	[06]	CO3	[L2]
OR				
Q.11(a)	Critically analyze the selection operators used in Genetic Algorithms and compare their strengths and weaknesses.	[06]	CO4	[L4]
(b)	Define genetic programming with an example.	[06]	CO5	[L1]

END OF PART B
END OF THE QUESTION PAPER