CBCS SCHEME

USN | | | | | | | | | | |

18MCA53

Fifth Semester MCA Degree Examination, July/August 2022
Machine Learning

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

1 a. Define machine learning and explain well-possed learning problem with example. **(05 Marks)**

b. Explain various stages involved in designing learning system. **(10 Marks)**

c. Write Finds Algorithm and explain. **(05 Marks)**

OR

2 a. Define concept learning and discuss inductive learning hypothesis. **(04 Marks)**

b. Give candidate elimination algorithm and find maximally general and specific hypothesis for the given training data set.

Sky	Temp	Humidity	Wind	Water	Forecast	Enjoy
Sunny	Warm	Normal	Strong	Warm	Same	Yes
Sunny	Warm	High	Strong	Warm	Same	Yes
Rainy	Cold	Strong	Strong	Warm	Charge	No
Sunny	Warm	High	Strong	Cool	Charge	Yes

(10 Marks)

c. Discuss various issues in machine learning. **(06 Marks)**

Module-2

3 a. State Entropy and Information Gain. **(02 Marks)**

b. Construct Decision Tree for the following Boolean functions :
i) $A \wedge \neg B$ ii) $A \vee (B \wedge C)$ iii) A XOR B. **(06 Marks)**

c. Discuss issues of avoiding over fitting of data, handling continuous attribute and missing attribute values in decision trees. **(12 Marks)**

OR

4 a. Discuss inductive Bias in Decision Tree learning and differentiate between two types of Bias. **(04 Marks)**

b. Describe ID_3 algorithm for decision tree learning. **(08 Marks)**

c. Explain various appropriate problems for decision tree learning. **(08 Marks)**

Module-3

5 a. What are the types of problems in which ANN can be applied? **(08 Marks)**

b. Give the algorithm for Back propagation. **(06 Marks)**

c. Explain the concept of perceptron with neat diagram. **(06 Marks)**

OR

6 a. What is Gradient Descent? Write gradient descent algorithm for training a linear unit. **(08 Marks)**

b. Discuss stochastic approximation to Gradient Descent. **(08 Marks)**

c. Differentiate between perceptron training rule and delta rule. **(04 Marks)**

Module-4

7 a. Define Bayes theorem. What is relevance and features of Bayesian theorem? **(08 Marks)**

b. Explain the concept of EM Algorithm. **(04 Marks)**

c. Explain Brute force Bayes concept learning with algorithm. **(08 Marks)**

OR

8 a. Consider the given dataset. Apply Naïve Baye's algorithm and predict that if a fruit has the following properties then which type of fruit it is. Fruit = {yellow, sweet, long}.
Given :

Fruit	Yellow	Sweet	Long	Total
Mango	350	450	0	650
Banana	400	300	350	150
Others	50	100	50	1200

(10 Marks)

b. Explain the concept of minimum description length principle. **(05 Marks)**

c. Explain Bayesian belief nets and conditional independence with example. **(05 Marks)**

Module-5

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9 a. Define Simple error and True error. **(04 Marks)**

b. Explain K – nearest neighbor learning algorithm. **(08 Marks)**

c. What are instance based learning? Explain key features and disadvantage of these methods. **(08 Marks)**

OR

10 a. Define variance, standard deviation and estimate bias of random variable. **(04 Marks)**

b. What is reinforcement learning? How it differs from other approximation tasks. **(08 Marks)**

c. Explain the Q-function Q-learning algorithm assuming deterministic rewards and actions. **(08 Marks)**

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