



CBCS SCHEME

USN

--	--	--	--	--	--	--	--	--	--

18MCA53

Fifth Semester MCA Degree Examination, Dec.2023/Jan.2024 Machine Learning

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Define machine learning. Describe the following problems with respect to Tasks, Performance and experience :
- (i) A checkers learning problem.
 - (ii) A handwritten recognition learning problem.
 - (iii) A robot driving learning problem.
- b. Discuss the steps in designing a learning system in detail.

(08 Marks)

(12 Marks)

OR

- 2 a. Explain perspective and issues in Machine Learning. (08 Marks)
- b. State Find-S algorithm and apply it to the following data set :

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

(08 Marks)

(04 Marks)

- c. Define consistent hypothesis and version spaces.

Module-2

- 3 a. Explain the characteristics of the problems suited for decision tree learning. (10 Marks)
- b. Discuss issues in Decision Tree Learning. (10 Marks)

OR

- 4 a. Explain hypothesis space search in Decision Tree Learning. (04 Marks)
- b. Define Entropy and Information gain. (06 Marks)
- c. Discuss insight into capabilities and limitation of ID₃. (10 Marks)

Module-3

- 5 a. Explain appropriate problems characteristics for Neural Network learning. (08 Marks)
- b. Summarize the concept of perceptron with a neat diagram. (06 Marks)
- c. Discuss in brief perceptron training role. (06 Marks)

OR

- 6 a. State and explain Gradient Descent Algorithm rule for training a linear unit. (08 Marks)
- b. Write a Stochastic Gradient Descent version of Back propagation algorithm for feed forward networks containing two layer of sigmoid unit. (08 Marks)
- c. Discuss difference between standard gradient descent and stochastic gradient descent. (04 Marks)

Module-4

- 7 a. Define Bayesian theorem. Discuss features of Bayesian learning methods. (10 Marks)
b. Write a note on :
(i) Minimum description length principle.
(ii) Bayesian Belief networks. (10 Marks)

OR

- 8 a. Explain Brute-Force Bayes concept learning. Also state concept learning algorithm to output MAP. (10 Marks)
b. Discuss Maximum Likelihood and Least Square Error Hypothesis. (10 Marks)

Module-5

- 9 a. Explain key difficulties that arise while estimating the Accuracy of Hypothesis. (04 Marks)
b. Define the following terms :
(i) Sample error
(ii) True error.
(iii) Random variable
(iv) Expected value (mean)
(v) Variance
(vi) Standard deviation. (06 Marks)
c. Explain K-nearest neighbor algorithm for approximating a discrete-valued function. (10 Marks)

OR

- 10 a. Discuss a general approach for deriving confidence intervals. (10 Marks)
b. Explain how reinforcement learning problem differs from other function approximation tasks. (10 Marks)
