Reg. No.												

Question Paper Code	13033

MBA - DEGREE EXAMINATIONS, NOV / DEC 2024

Third Semester

Master of Business Administration

20MBS303 – ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING FOR DECISION MAKING

Regulation - 2020

Duration: 3 Hours | Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

		Marks	K – Level	CO
1.	What is the main difference between AI and Machine Learning?	2	K2	CO1
2.	Describe the concept of Statistics in the context of Data Science.	2	K2	CO1
3.	What is the Beta-binomial model, and how does it relate to probability?	2	K2	CO2
4.	How does Gaussian discriminant analysis (GDA) model the decision boundaries between classes?	2	K2	CO2
5.	What is the core idea behind Bayesian Statistics and how does it differ from traditional frequentist statistics?	2	K2	CO3
6.	What does Model Fitting mean in the context of Logistic Regression?	2	K2	CO3
7.	What is the core idea behind Divide and Conquer in AI problem-solving?	2	K2	CO4
8.	What is the purpose of the activation function in a neural network?	2	K2	CO4
9.	Explain the concept of Time Series Forecasting and its application in AI.	2	K2	CO5
10.	How does an RNN handle sequential data differently from a traditional neural network?	2	K2	CO3

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

			Marks	K – Level	CO
11.	a)	Examine the role of Reinforcement Learning in solving complex decision-making problems. How does Reinforcement Learning differ from other types of machine learning? Discuss its applications in real-world scenarios like robotics, gaming, and autonomous vehicles. What challenges does it face in terms of scalability and real-world implementation?	13	K3	CO1
		OR			
	b)	Evaluate the importance of choosing the right Machine Learning Framework for building and deploying machine learning systems. Discuss the features of popular ML frameworks like TensorFlow, PyTorch, and Scikit-learn. How do these frameworks support different stages of the machine learning pipeline, from data preprocessing to model deployment? Provide examples of how each framework is used in specific applications.	13	K3	CO1

12. a) Discuss the fundamental concepts of Probability Theory and explain its importance in statistical modeling and machine learning. Provide examples of how Discrete and Continuous probability distributions are used to model real-world problems. *13 K3 CO2*

OR

b) Explain the Bayesian Concept Learning framework. How does it differ from frequentist approaches, and what are the advantages of using Bayesian Learning in uncertain environments? Discuss the use of prior and posterior probabilities with the example of a Beta-Binomial model. *13 K3 CO2*

13. a) Explain the concept of Hierarchical Bayes models. How do these models improve the estimation of parameters, and in what situations would you prefer to use them over traditional Bayesian methods? Discuss their application with an example. *13 K3 CO3*

OR

b) Describe the principles behind Bayesian Decision Theory. How does it help in making decisions under uncertainty, and what are the steps involved in applying it? Provide an example where Bayesian Decision Theory is used to make optimal decisions. *13 K3 CO3*

14. a) Explain the concept of Divide and Conquer in the context of AI. How is it applied in problem-solving techniques and AI algorithms? Provide examples of problems that can be solved effectively using this approach, and discuss its advantages and limitations. *13 K3 CO4*

OR

b) Explain the structure of a Multilayer Perceptron (MLP) and Feedforward Neural Network (FFN). Discuss their components, how they process information, and the role of backpropagation in training these networks. Illustrate with an example of how an MLP is used in a classification task. *13 K3 CO4*

15. a) Explain the process of time series forecasting using Recurrent Neural Networks (RNNs). How can RNNs be trained to predict future values based on historical data, and what are the key challenges and techniques in applying RNNs to time series problems? Provide a detailed example of a time series forecasting application, such as stock price prediction **or** weather forecasting. *13 K3 CO5*

OR

b) Discuss the applications of Recurrent Neural Networks (RNNs) in Artificial Intelligence (AI) across various sectors such as natural language processing (NLP), finance, healthcare, and autonomous driving. For each sector, provide an example where RNNs are used to solve a specific problem, and evaluate the effectiveness of RNN-based solutions in those areas. *13 K3 CO5*

PART - C (1 × 15 = 15 Marks)
(Compulsory)

16.	a)	Provide an in-depth analysis of Discrete and Continuous Probability Distributions. Discuss the differences, key characteristics, and applications of each. Also, explain how Gaussian models (such as Gaussian Discriminant Analysis**)** are used to model continuous variables. Include examples where both types of distributions are utilized in practical machine learning tasks.	*15*	*K3*	*CO2*