

Reg.No.:



VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 130007

B.E. / B.Tech. DEGREE END-SEMESTER EXAMINATIONS – NOV. / DEC. 2024

Fifth Semester

Computer Science and Technology

U19CT508 – ARTIFICIAL INTELLIGENCE AND ITS APPLICATIONS

(Regulation 2019)

Time: Three Hours

Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	List out the types of agents based on their degree of perceived intelligence and capability.	2	K2	CO1
2.	List out the key components of an intelligent agent's architecture.	2	K1	CO1
3.	Define Bayesian inference.	2	K2	CO2
4.	Find the major challenges in Knowledge representation.	2	K2	CO2
5.	Outline the primary goal of statistical learning theory in the context of machine learning?	2	K2	CO3
6.	State the principle behind maximum-likelihood parameter learning.	2	K2	CO3
7.	What is feature extraction in machine learning, and why is it important?	2	K1	CO4
8.	What information does a histogram provide in data visualization?	2	K3	CO4
9.	Define the Term Frequency Inverse Document Frequency (TF-IDF) used for in NLP.	2	K2	CO5
10.	What is sentiment analysis, and where is it commonly used?	2	K1	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11.	a) Describe the role of ontological engineering in knowledge representation.	13	K3	CO1
	(OR)			
	b) i. Summarize the importance of trust and reputation in multi-agent systems.	6	K2	CO1
	ii. What is modal logic, and how is it applied in reasoning about mental objects in AI?	7	K2	CO1
12.	a) i. Explain the concept of a Naïve Bayes model, including how it is constructed and its application in classification tasks.	6	K2	CO2
	ii. Provide a detailed example demonstrating how Bayesian inference is used in a Naïve Bayes classifier.	7	K2	CO2
	(OR)			
	b) Define Hidden Markov Models (HMMs) and describe their basic components. How does an HMM handle uncertainty in sequential data?	13	K3	CO2
13.	a) Explain in detail about the maximum-likelihood estimation (MLE) method for parameter learning in probabilistic models. Include the steps involved in applying MLE to a specific example, such as fitting a Gaussian distribution to a dataset.	13	K2	CO3
	(OR)			
	b) Explain at least two problems (in terms of states, transitions, and rewards) which can be modeled and solved using a reinforcement learning framework. What are active and passive reinforcement frameworks.	13	K2	CO3
14.	a) Explain how machine learning differs from traditional programming and provide examples of practical problems where machine learning techniques are beneficial. What are the typical steps in solving a problem using machine learning?	13	K3	CO4
	(OR)			
	b) Explain in detail about the different types of data visualizations, such as line charts, bar charts, pie charts, and scatter plots. Explain when each type is most appropriate and what insights they can provide.	13	K2	CO4
15.	a) Illustrate the main objectives of Natural Language Processing (NLP) and explain why NLP is a crucial area of study within artificial intelligence. What are the various steps in NLP.	13	K2	CO5

(OR)

- b) Provide examples of common NLP tasks and explain how each task is performed. Discuss the significance of these tasks in practical applications. 13 K3 CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.	Questions	Marks	KL	CO
16. a)	Consider a dataset containing measurements of various features from different species of wine, where the objective is to classify the wine into distinct types and identify any anomalies in the dataset. Explain how you would implement a GMM to cluster the wine data.	15	K3	CO3

(OR)

- b) You are a data scientist at Twitter tasked with building a system to detect bot accounts that are being used to spam the platform. How would you approach this problem? 15 K3 CO4