PAPER ID-310751

Roll No: | | | | | | | | | | | | | |

MCA
(SEM III) THEORY EXAMINATION 2024-25
ARTIFICIAL INTELLIGENCE

TIME: 3 HRS   M.MARKS: 100

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1.   Attempt all questions in brief.   2 x 10 = 20

Q no.	Question	CO	Level
a.	What are the different branches of artificial intelligence?	1	K1
b.	State any two foundation areas of artificial intelligence.	1	K1
c.	Compare uninformed and informed search methods.	2	K4
d.	What is a heuristic function, and how does it affect informed searching techniques?	2	K2
e.	Demonstrate Modus Ponen's rule in propositional Calculus?	3	K3
f.	What do you mean by the knowledge representation?	3	K2
g.	Explain naïve bayes classifier.	4	K2
h.	What are statistical learning models.	4	K2
i.	Write short note on Support Vector Machine (SVM)	5	K2
j.	Differentiate concept of clustering and classification	5	K4

SECTION B

**2.   Attempt any three of the following: 10 x 3 = 30**

a.	Explain various steps involved in natural language processing.	1	K2
b.	Explain alpha-Beta pruning with example	2	K3
c.	Describe the use of Hidden Markov models and explain it with suitable example	3	K2
d.	Write short note on the following: i) Reinforcement learning ii) Unsupervised learning.	4	K2
e.	Design principles of pattern recognition system. Explain Principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA).	5	K2

SECTION C

3.   Attempt any one part of the following: 10 x 1 = 10

a.	Describe intelligent agents in terms of Precepts, Actions, Goals and Environment with suitable block diagram and example.	1	K2
b.	How can computer vision be used in autonomous vehicles? Explain the role of object detection and depth estimation.	1	K2

4.   Attempt any one part of the following: 10 x 1 = 10

a.	Give the following graph, apply A* algorithm and find the shortest path from node (a) to node (z).	2	K3
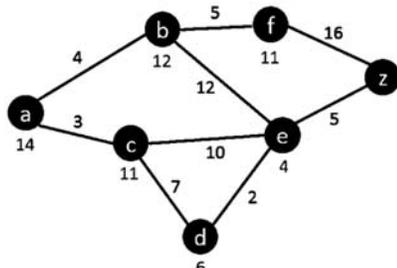
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b.	Examine how AO* doesn't explore all the solution paths once it got the solution with a suitable example.	2	K3

5. **Attempt any *one* part of the following:**   **10 x 1 = 10**

a.	Write down the algorithm for converting FOPL into CNF and converting Demonstrate the steps on given sentences
	   i. John like all kinds of food.
	   ii. Apples are food.
		3	K3

b.	Convert the following sentence into predicate logic and then prove "Was Marcus loyal to Caesar? using resolution: 1. Marcus was a man. 2. Marcus was a Pompeian. 3. All Pompeian's were Romans. 4. Caesar was a ruler. 5. All Romans were either loyal to Caesar or hated him. 6. Everyone is loyal to someone. 7. People only try to assassinate rulers they are not loyal to. 8. Marcus tried to assassinate Caesar.	3	K3

6. **Attempt any *one* part of the following:**   **10 x 1 = 10**

a.	**Examine** ID3 algorithm to understand the concept of learning using decision tree with proper example.	4	K3
b.	**Describe** the two main steps of the EM algorithm. (a) Expectation Step (E-step) (b) Maximization Step (M-step)	4	K3

7. **Attempt any *one* part of the following:**   **10 x 1 = 10**

a.	Discuss k-means clustering algorithm with an suitable example.	5	K3
b.	You are given the following dataset of 5 points with two features (X1, X2), and a class label (A or B): Now, consider a new point (X1 = 5, X2 = 6). Apply KNN with K=3 to classify this point.	5	K3

X1	X2	Class
2	3	A
3	3	A
6	5	B
7	8	B
4	4	A