RollNo. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. /B.Tech / B. Arch (Full Time) - END SEMESTER EXAMINATIONS, NOV/DEC 2023

INFORMATION TECHNOLOGY

V Semester

ITM501 ARTIFICIAL INTELLIGENCE

(Regulation2019)

Time:3hrs Max.Marks: 100

CO1	Understand and apply search strategies for real time problems
CO2	Apply reasoning techniques to real world problem
CO3	Derive inferences using lower order logic
CO4	Understand the usage of various AI planning techniques
CO5	Design and use various learning models based on the problem requirements
CO6	Create AI applications for a particular problem in NLP domain

BL – Bloom's Taxonomy Levels

(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

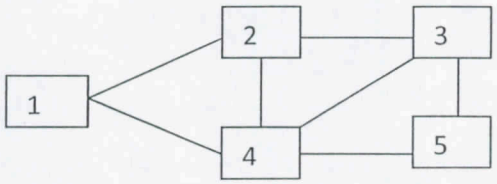
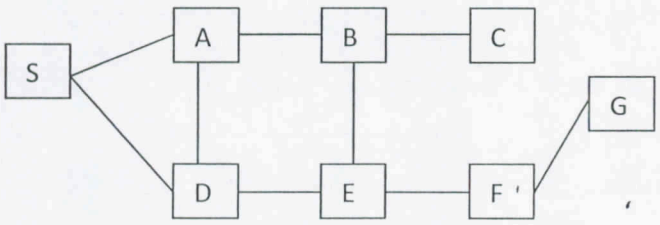
PART- A(10x2=20Marks)

(Answer all Questions)

Q.No	Questions	Marks	CO	BL
1	For each of the following assertions say whether it is true or false? a. An agent that sense only partial information about the state cannot be perfectly rational b. There is a model-based reflex agent that can remember all of percepts.	2	CO2	L2
2	Compare the space requirements for DFS and BFS search algorithms.	2	CO1	L2
3	Define Tautology.	2	CO3	L1
4	Differentiate between universal quantifier and existential quantifier.	2	CO3	L1
5	List the different kinds Edges in planning graph.	2	CO4	L1
6	Enumerate the advantages of partial order planning.	2	CO4	L1
7	When you say a hypothesis is underfitting?	2	CO5	L2
8	Consider the example below where the mass, y(grams), of a chemical is related to the time, x(seconds), for which the chemical reaction has been taking place according to the table: Time(x) Seconds: 5, 7, 12, 16, 20 Mass (y) Grams: 40, 120, 180, 210, 240 Find the equation of the regression line.	2	CO5	L2
9	Define N-gram model	2	CO6	L1
10	What is the percentage that both the documents are similar? a. Deep Learning can be hard b. Deep Learning can be simple	2	CO6	L2

PART- B(5x 13=65Marks)

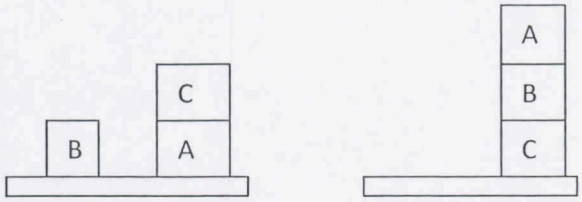
(Restrict to a maximum of 2 subdivisions)

Q.No	Questions	Marks	CO	BL
11 (a) (i)	Write in detail about different properties of task environment and also give an example for each task environment.	5	CO1	L4
(ii)	Define Constraint Satisfaction Problem. Using CSP search algorithm Color each node of the graph given below either with red, green or blue in such a way that no neighbouring node have the same color.  	8	CO2	L3
	OR			
11 (b) (i)	Explain in detail the different kinds of agent programs with suitable example.	5	CO1	L4
(ii)	Find the minimum path distance from S to G using A * search algorithm.  | | S | A | B | C | D | E | F | G | h (n) | | S | 0 | 3 | 0 | 0 | 4 | 0 | 0 | 0 | 11.5 | | A | 3 | 0 | 4 | 0 | 5 | 0 | 0 | 0 | 10.1 | | B | 0 | 4 | 0 | 4 | 0 | 5 | 0 | 0 | 5.8 | | C | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 3.4 | | D | 4 | 5 | 0 | 0 | 0 | 2 | 0 | 0 | 9.2 | | E | 0 | 0 | 5 | 0 | 2 | 0 | 4 | 0 | 7.1 | | F | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 3.5 | 3.5 | | G | 0 | 0 | 0 | 0 | 0 | 0 | 3.5 | 0 | 0 |	8	CO2	L3
12 (a) (i)	Represent the following sentences in first-order logic using a consistent vocabulary. 1.Some students took Statistics in spring 2022. 2.Every student who takes Tamil passes it. 3.Only one student took Geography in spring 2022. 4.The best score in Tamil is always higher than the best score in English. 5.Every student should take English. 6.Student takes Mathematics should not take Biology	13	CO3	L3

OR

12 (b) (i)	Use resolution for the following facts 1.John likes all kind of food 2.Apple & Vegetables are food 3.Anything anyone eats and not killed is food 4.Anil eats peanuts and still alive 5.Hary eats everything that anil eats and prove that "John likes peanuts"	**13**	CO3	L3
13 (a) (i)	Derive a plan for the for the following instance. Initially, an agent is at home without book, without pen and without tea. Finally, it should have pen, book and tea. Use the following predicates: At(x), Have(y) and Sells(x,y) and actions as: Go(y) - Agent goes to y, causing At(y) to be true., Buy(z) - Agent buys 'z', causing Have(z) to be true. Use STRIPS to define actions and states appropriately first with Preconditions and effects. Then derive a step by step plan.	**13**	CO4	L4

OR

13 (b) (i)	 Start state Goal State Use STRIPS to define actions and states appropriately first with Preconditions and effects. Then derive a step by step plan.to arrange the block as in goal state from start state.	**13**	CO4	L4
14 (a) (i)	Predict using Navie Bayes classifier, whether the person the Buys Computer or not whose instance are: age = <=30, income = Medium, Student = Yes, Credit-Rating = Fair based on the following observation.	**13**	CO5	L4

S.No	Age	Income	Student	Credit - Rating	Buys Computer
1	<=30	High	No	Fair	No
2	<=30	High	No	Excellent	No
3	31-40	High	No	Fair	Yes
4	>40	Medium	No	Fair	Yes
5	>40	Low	Yes	Fair	Yes
6	>40	Low	Yes	Excellent	No
7	31-40	Low	Yes	Excellent	Yes
8	<=30	Medium	No	Fair	No
9	<=30	Low	Yes	Fair	Yes
10	>40	Medium	Yes	Fair	Yes
11	<=30	Medium	Yes	Excellent	Yes
12	31-40	Medium	No	Excellent	Yes
13	31-40	High	Yes	Fair	Yes
14	>40	Medium	No	Excellent	No

OR

15 (a) (i)	Explain in detail with an example about Bag-of-words model.	5	CO6	L3
(ii)	Which of the following statements are more similar and which words in that statement plays a major role in determining the similarity. a.It is going to rain today. b.Today I am not going outside. c.I am going to watch the season premiere.	8	CO6	L3
	OR			
15 (b) (i)	Explain in detail with an example about Word Embedding model.	5	CO6	L3
(ii)	Construct the parse tree for the sentence " I detect the beautiful rose near me" S -> NP | VP NP -> Pronoun | NP | PP | Article | Adjective | Noun VP -> Verb | NP PP -> Prep | NP Article -> the Adjective -> beautiful Noun -> rose Prep -> near Pronoun -> me Verb -> detect Pronoun -> I	8	CO6	L3

PART- C(1x 15=15Marks)

(Q.No.16 is compulsory)

Q.No	Questions	Marks	CO	BL
16.	Tag the given sentence **"Jane Will Spot Will"** with parts of speech tags using Hidden Markov Model based on the following data set. a. Calculating Emission and Transition Probability b. Tagging the given Sentences	10 5	CO5 CO6	L6

Mary	Jane	Can	See	Will
(N)	**(N)**	**(M)**	**(V)**	**(N)**
Spot	Will	See	Mary	
(N)	**(M)**	**(V)**	**(N)**	
Will	Jane	Spot	Mary	
(M)	**(N)**	**(V)**	**(N)**	
Mary	Will	Pat	Spot	
(N)	**(M)**	**(V)**	**(N)**	