Total No. of Printed Pages: 3

PRN No.	

PAPER CODE	U314-2101-(E3E)

(AY:2024-25) December 2024 (ENDSEM) EXAM

TY (SEMESTER - I)

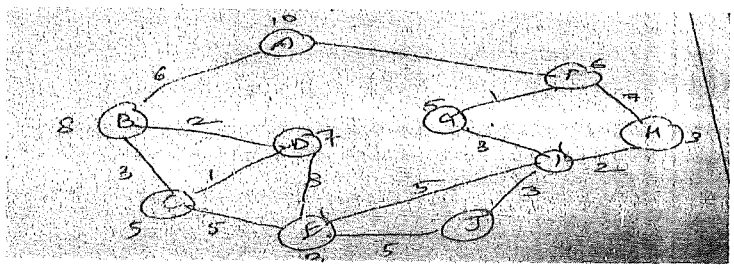
COURSE NAME: Artificial Intelligence **Branch: I.T** **COURSE CODE:ITUA31201**

T.Y 2020

Time: [1Hr 30 Min] **[Max. Marks: 40]**

Instructions to candidates:

1) **Figures to the right indicate full marks. Use of scientific calculator is allowed**
2) **Use suitable data wherever required**
3) **All questions are compulsory. Solve any two sub question each from Questions 1 and 2**
4) **Solve any one sub question (2 marks) from Questions 3 ,4 ,5 and 6 and sub question of 4 marks is compulsory from questions 3,4,5,and 6**

Q. No.	Question Description	Max. Marks	CO mapped	BT Level
Q.1	a)Compare Machine learning, Deep learning and Data Science	[4]	[1]	[2]
	b)How do the different domains of AI (e.g., Natural Language Processing, Computer Vision, Robotics) contribute to solving real-world problems?	[4]	[1]	[2]
	c) Implement a typical intelligent agent in a dynamic environment, such as a stock market?	[4]	[1]	[3]
Q2	a)Solve the example using A* algorithm where Source is S and Goal node is H 	[4]	[2]	[3]
	b)Describe the "Generate and Test" method as a heuristic search strategy. When might this approach be useful, and what are its limitations?	[4]	[2]	[3]
	c) You are given a map with different regions or countries, and you must color each region using one of three colors: **Red (R)**, **Green (G)**, or **Blue (B)**. The constraint is that **no two adjacent regions can have the same color.**	[4]	[2]	[3]

	Consider five regions on a map: **A, B, C, D, E**. The adjacency relationships (edges) are as follows: • **A** is adjacent to **B** and **C**. • **B** is adjacent to **A**, **C**, and **D**. • **C** is adjacent to **A**, **B**, and **D**. • **D** is adjacent to **B**, **C**, and **E**. • **E** is adjacent to **D**.			
Q3	a)Create first-order logic statements to represent the following family relationships: "Alice is the mother of Bob," "Bob is the brother of Carol," and "Carol is the daughter of Alice." OR b)Given the two expressions P(x,y) and P(John,y), identify the substitutions needed to unify them. Explain your answer. c) Consider the following axioms: 1. All hounds howl at night. 2. Anyone who has any cats will not have any mice. 3. Light sleepers do not have anything, which howls at night. 4. John has either a cat or a hound. 5. (Conclusion) If John is a light sleeper, then John does not have any mice. Prove the conclusion using resolution	[2] [2] [4]	[3] [3] [3]	[3] [3] [3]
Q4	a)Explain hill climbing algorithm. Explain plateau, ridge, local maxima and global maxima. OR b)Compare Goal stack planning and non linear planning c) There are 3 boxes. B1 has 2 white, 3 black and 4 red balls. B2 has 3 white, 2 black and 2 red balls. B3 has 4 white, 1 black and 3red balls. A box is chosen at random and 2 balls are drawn. 1 is white and the other is red. What is the probability that they came from the first box?? (Solve using Baye's Rule)	[2] [2] [4]	[4] [4] [4]	[2] [2] [3]
Q.5	a)Discuss how explanation based learning approach can be used with Robot Navigation and Medical Diagnosis OR b)Explain the typical architecture of an expert system. What are the main components, and how do they interact to facilitate decision-making? c) Predicate an expert system for DART. Define following components in the above expert system: i) Human Expert ii) Knowledge Engineer iii) Knowledge Base	[2] [2] [4]	[5] [5] [5]	[2] [2] [3]

	iv) Inference Engine v) Inferences vi) User (May not be an expert).			
Q.6	a) Discuss the challenges and approaches in machine translation.	[2]	[6]	[2]
	OR			
	b) Outline the steps involved in the NLP process, from text Understanding to generation.	[2]	[6]	[2]
	c) Provide examples illustrating the applications of AI in various fields based on the described concepts in NLP, information retrieval, computer vision, and robotics.	[4]	[6]	[2]

Note: [BT level- 1: Remember 2: Understand 3: Apply 4: Analyze 5: Evaluate 6: Create]