Name: **Enrolment No:**	

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2023

Course: Problem Domains of AI **Semester: I**
Program: MCA **Time: 03 hrs.**
Course Code: CSAI7012 **Max. Marks: 100**

Instructions: Attempt all questions.

SECTION A
(5Qx4M=20Marks)

S. No.		**Marks**	**CO**
Q 1	Write about PEAS in AI. Write PEAS model for a) Hospital management system and b) Part picking robot.	**4**	**CO1**
Q2	Provide two concrete real-world examples demonstrating the application of artificial intelligence (AI).	**4**	**CO1**
Q3	Give a brief about techniques used for knowledge representation.	**4**	**CO2**
Q4	Write a note on Single-Layer Feed Forward Networks.	**4**	**CO5**
Q5	Differentiate: a) Classification and Clustering algorithms b) Inductive and deductive learning	**4**	**CO4**

SECTION B
(4Qx10M= 40 Marks)

Q 6	a) Determine the truth value of the following compound proposition: P ^ (Q V ~P) where P is true, and Q is false. b) Use resolution to show that the hypothesis "Allen is a bad boy or Hilary is a good girl" and "Allen is a good boy or David is happy" implies the conclusion "Hilary is a good girl and David is happy."	**10**	**CO2**
Q 7	Consider a simplified version of the Wumpus World problem in a 4x4 grid. The agent is placed in a cell (1,1) and is equipped with sensors to navigate and make decisions. The following rules apply: • The Wumpus (a dangerous creature) is located at (3,3). • There is a pit at (2,2). • The agent has only two actions: MOVE and SHOOT. • The agent has five percept types: BREEZE, STENCH, GLITTER, BUMP, and SCREAM. a) Using a knowledge base and propositional logic, represent the agent's initial knowledge about the environment, including the location of the Wumpus and the pit. Provide a clear and comprehensive knowledge base for the agent.	**4+3 +3**	**CO2**

	b) Describe how the agent can make safe moves and actions based on its knowledge and sensory inputs. Assume the agent starts with a blank knowledge base and explains its decision-making process. c) Suppose the agent wants to navigate the environment to pick up the gold at (4,1) without getting killed by the Wumpus or falling into a pit. Provide a sequence of actions that the agent should take to achieve this goal and explain its reasoning for each step.		
Q8	Elaborate on components and applications of expert systems.	**10**	**CO3**
Q 9	List and explain the stages of the machine learning process, providing a clear description of the steps involved in each phase.	**10**	**CO4**
	OR		
Q 9	Discuss the various types of machine learning techniques and provide detailed explanations for each type covering key characteristics, applications, and advantages or disadvantages.	**10**	**CO4**
	SECTION-C **(2Qx20M=40 Marks)**		
Q 10	Provide an intuitive explanation of Linear Support Vector Machines (SVMs) and discuss the factors that influence decision boundaries in SVM. Moreover, explain the scenarios in which SVM is a more suitable choice compared to Random Forest, and conversely, when you would opt for Random Forest over SVM.	**20**	**CO4**
Q 11	Discuss the critical design issues and considerations in building artificial neural networks (ANNs), highlighting their impact on the network's performance and capabilities.		**CO5**
	OR		
Q 11	"NLP architectures use various methods for data preprocessing, feature extraction, and modeling." Elaborate on each phase in detail.	**20**	**CO5**