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B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

June 2025 Semester End Main Examinations

Programme: B.E. **Semester: VI**

Branch: Industrial engineering & Management **Duration: 3 hrs.**

Course Code: 23IM6PEAML **Max Marks: 100**

Course: Artificial Intelligence and Machine Learning

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	***CO***	***PO***	**Marks**
1	a)		What is Artificial Intelligence? Explain the underlying assumption about human intelligence that forms the basis for the development of AI systems?	*CO1*	*PO1*	**05**
	b)		How are AI tasks classified? Explain briefly.	*CO1*	*PO1*	**05**
	c)		Explain the State, Space and Search in the context of AI systems with an example.	*CO1*	*PO1*	**05**
	d)		Compare the working of BFS and DFS techniques.	*CO1*	*PO1*	**05**
			OR			
2	a)		Explain the role of a Production System in AI along with its component parts? Explain the utility of each type of Production System with an example for each.	*CO1*	*PO1*	**10**
	b)		How is the concept of 'Heuristics' helpful in solving a problem? Explain. Also explain with an example how heuristics attempts to resolve the conflict between 'efficiency' and 'completeness' in a search process.	*CO1* *CO2*	*PO1* *PO2*	**10**
			UNIT - II			
3	a)		What is Knowledge Representation and describe the challenges faced in this domain? Explain each type of Knowledge Representation formalism with relevant examples.	*CO1* *CO2*	*PO1* *PO2*	**08**
	b)		What does 'Proof by Contradiction' formalism mean in Resolution technique? Explain its role in resolving problems in AI.	*CO1* *CO2*	*PO1* *PO2*	**04**
	c)		What is the procedure to convert WFFs into CNF? Explain the utility of such a conversion in resolving the problems in AI.	*CO1* *CO2*	*PO1* *PO2*	**08**

			OR			
	4	a)	Translate the following English sentences to WFFs: 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. Prove by Resolution, 'If John is a light sleeper, then John does not have any mice.'	*CO3*	*PO2* *PO3*	**16**
		b)	Explain Forward and Backward Chaining mechanisms with an illustration for each.	*CO1* *CO2*	*PO1* *PO2*	**04**
			UNIT - III			
	5	a)	Explain any three established ways of handling uncertainty in the real-world problems while developing reasoning system in AI.	*CO1* *CO2*	*PO1* *PO2*	**12**
		b)	Explain the key differences between Fuzzy logic comparing it with probability? Explain the application of Fuzzy Logic with the help of a security alarm system.	*CO1* *CO2*	*PO1* *PO2*	**08**
			OR			
	6	a)	Using MYCIN's rules for inexact reasoning, compute CF, MB and MD of a Hypothesis h given three observations where CF(h, o_1) = 0.5, CF(h, o_2) = 0.3 and CF(h, o_3) = -0.2	*CO3* *CO4*	*PO2* *PO3* *PO4*	**06**
		b)	Explain the strengths of Dempster-Shafer theory of probabilistic reasoning in comparison to CF and Bayesian Networks.	*CO3* *CO4*	*PO2* *PO3* *PO4*	**06**
		c)	Define a Universal Set in an age domain about the residents in a locality and define fuzzy sets as Infant, Young, Adult and Senior Citizen and depict them graphically.	*CO3* *CO4*	*PO2* *PO3* *PO4*	**08**
			UNIT - IV			
	7	a)	What is 'Learning' in the context of Expert Systems? How are they classified? Explain with an example for each category.	*CO1* *CO2*	*PO1* *PO2*	**08**
		b)	Explain the process of Speech recognition and understanding in AI with an illustration.	*CO3* *CO4*	*PO2* *PO3* *PO4*	**06**
		c)	With the help of a line diagram explain briefly the structure of an Expert System Shell.	*CO1* *CO2*	*PO1* *PO2*	**06**
			OR			
	8	a)	Explain 'Pattern Recognition' concept with the aid of any two areas of real-life application along with the difficulties faced in implementing it?	*CO1* *CO2*	*PO1* *PO2*	**08**

		b)	What is the use of Expert System Shells? Explain with an example.	*CO1* *CO2*	*PO1* *PO2*	**06**
		c)	Name the tools used in Pattern Recognition for Machine Learning. Explain any three of them.	*CO1* *CO2*	*PO1* *PO2*	**06**
			UNIT - V			
	9	a)	List and briefly enumerate the Performance measures used to evaluate Knowledge Acquisition systems.	*CO1* *CO2*	*PO1* *PO2*	**10**
		b)	Explain with the help of a checker game example the working principle of Perceptron.	*CO3* *CO4*	*PO2* *PO3* *PO4*	**10**
			OR			
	10	a)	Explain the working of the following Expert Systems (any two): i) MYCIN ii) PUFF iii) DENDRAL	*CO1* *CO2*	*PO1* *PO2*	**10**
		b)	Write notes on (any two): i) Learning Automata ii) Genetic Algorithm iii) Intelligent Editors.	*CO1* *CO2*	*PO1* *PO2*	**10**

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