U.S.N.										

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

Autonomous Institute Affiliated to VTU

August 2024 Supplementary Examinations

Programme: B E **Semester: IV**
Branch: Artificial Intelligence and Machine Learning **Duration: 3 hrs.**
Course Code: 20AM4PCIAI **Max Marks: 100**
Course: Introduction to Artificial Intelligence

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

UNIT - I

1	a)	Define Artificial Intelligence and mention its applications.	**4**
	b)	Write an algorithm for uniform cost search with an example.	**6**
	c)	Discuss the production rules for solving the water-jug problem using BFS.	**10**

UNIT - II

2	a)	Write an algorithm for simple Hill Climbing and list its limitations.	**7**
	b)	Describe the cryptarithmetic problem of eliminating possibilities. Apply the same to solve the following example. USA + USSR= PEACE.	**7**
	c)	Explain problem reduction with respect to AND-OR graph.	**6**

OR

3	a)	Implement AO* search algorithm with an example.	**12**
	b)	Apply means-end analysis on a simple household robot domain.	**8**

UNIT - III

4	a)	Describe the issues of knowledge representation.	**6**
	b)	Consider the following predicates: Man(Marcus) Pompeian(Marcus) Born(Marcus, 40) $\forall x: man(x) \rightarrow mortal(x)$	**6**

$\forall x: pompeian(x) \rightarrow died(x, 79)$

Erupted(volcano,79)

$\forall x: \forall t1: \forall t2: mortal(x) \Delta born(x, t1) \Delta gt(t2 - t1, 150) \rightarrow dead(x, t2)$

Now=1991

$\forall x: \forall tL[alive(x, t) \rightarrow \sim dead(x, t)] \Delta [\sim dead(x, t) \rightarrow alive(x, t)]$

$\forall x: \forall t1: \forall t2: dead(x, t1) \Delta gt(t2, t1) \rightarrow dead(x, t2)$

Prove that: $\sim alive(Marcus, now)$

c) Explain semantic knowledge and ontology-based representation with an example. **8**

OR

5 a) Differentiate forward chaining and backward chaining used in logical inference algorithms. **8**

b) With an illustration, explain the process of converting well-formed formulas to clause form. **8**

c) Differentiate between procedural and declarative knowledge. **4**

UNIT - IV

6 a) Describe the uncertain knowledge in AI with an example. How to handle them? **5**

b) State and explain Baye's rule in combining evidences with an example. **7**

c) Outline the steps on how to construct a Bayesian network in such a way that the resulting joint distribution is a good representation of a given domain, with an example. **8**

UNIT-V

7 a) Define expert systems. Why is an expert system needed? **6**

b) Explain the application of EMYCIN with an example. **6**

c) Explain the EMYCIN rule from the SACON expert systems. **8**

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