RAMAIAH
INSTITUTE OF
TECHNOLOGY

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(Autonomous Institute, Affiliated to VTU)
Bangalore – 560 054

SUPPLEMENTARY SEMESTER EXAMINATIONS – AUGUST 2017

Course & Branch	:	**B.E. – Computer Science & Engineering**	**Semester**	:	**VI**
Subject	:	**Artificial Intelligence**	**Max. Marks**	:	**100**
Subject Code	:	**CSPE611/CSPE16**	**Duration**	:	**3 Hrs**

Instructions to the Candidates:

- Answer one full question from each unit.
- Support your answers with examples and diagrams where ever necessary.

UNIT - I

1. a) Write the pseudo code of a simple Table Driven Agent. Do chess, taxi driver agent and vacuum cleaner agent behave rational when they are table driven? Justify with reasons. CO1 (08)

   b) Consider a state space where the start state is number 1 and the successor function for state n returns two states, numbers 2n and 2n +1. CO1 (12)
   i. Draw the portion of the state space for states 1 to 15. Suppose the goal state is 11, List the order in which nodes will be visited for breadth first Search, depth first search, depth-limited search with limit 3, and bidirectional search.

   ii. Compare the above uninformed search strategies in terms of the four evaluation criteria and explain the notations.

2. a) For each of the following agents, develop a PEAS description and list the properties of the task environment: CO1 (10)
   i. Robot soccer player; ii. Satellite image analysis system.

   b) Apply problem solving approach to formulate 8 puzzles and vacuum cleaner agent problem. Justify solution using state space tree. CO1 (10)

UNIT – II

3. a) Solve the 8 puzzle problem using A * algorithm. CO2 (08)

Start_State :

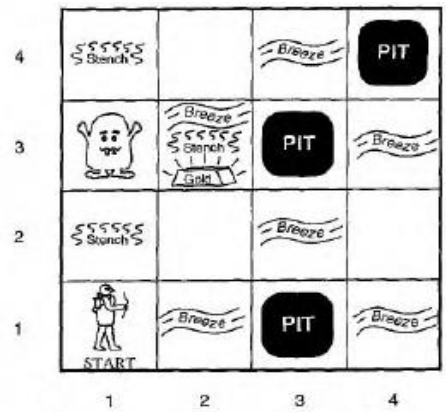
B	H	C
A	F	D
G		E

Goal_State:

A	B	C
H		D
G	F	E

Also prove that A* using TREE-SEARCH is Optimal if h (n) is admissible.

   b) Mention PEAS for the Wumpus world and create a simple KB, using inference and reasoning patterns in propositional logic to prove that there is no pit in [1,2] CO2 (12)



4. a) Given the following, can you prove that the unicorn is mythical? How about magical? Horned? CO2 (08)
" If the unicorn is mythical, then it is immortal, but if it is not mythical, then it is a mortal mammal. If the unicorn is either immortal or a mammal, then it is horned. The unicorn is magical if it is horned."

   b) Construct a circuit for determining whether the agent is at [1,1]. Also Compare Inference based agent with Circuit based agent built on the basis of propositional logic. CO2 (12)

UNIT – III

5. a) Represent the following sentences in first-order logic, using a consistent vocabulary: CO3 (08)
   - Politicians can fool some of the people all of the time, and they can fool all of the people some of the time, but they can't fool all of the people all of the time.
   - If a person cannot receive an idea then he cannot use that idea.
   - All people living in houses that have been built in 2010 or built in 2011 have been taxed.
   - Some people like anchovies.

   b) Compare the techniques of forward chaining and backward chaining used in First order predicate logic. Use suitable examples to justify your answer. CO3 (12)

6. a) Define the following terms as applied to predicate logic. Use suitable examples: CO3 (08)
   - Atomic sentences
   - Well-formed Formulae
   - Quantifiers
   - Connection between the existential and universal quantifiers.

   b) Given the statements:" Everyone who loves all animals is loved by someone. Anyone who kills an animal is loved by no one. Jack loves all animals. Either Jack or Curiosity killed the cat, who is named Tuna". Answer the question "Did Curiosity kill the cat"? Using the resolution process. (All the intermediate steps are to be written down correctly). CO3 (12)

UNIT – IV

7. a) Write the decision tree learning algorithm and List the attributes required to decide whether to wait for a table at a restaurant. Illustrate it with a neat decision tree. CO4 (10)

   b) What can a dentist conclude if her nasty steel probe catches in the aching tooth of a patient? Justify how Bayes 's rule combine evidences to provide the solution. CO4 (10)

8. a) Write the Graph plan algorithm and Illustrate "Have cake and eat cake too" problem using planning graphs. CO4 (10)

   b) Point out some of the possible variations in Strips language. Represent transportation of air cargo between airports using Strips and provide solution plan to the problem. CO4 (10)

UNIT - V

9.	a)	List the steps in the natural language understanding process and explain the same using suitable examples.	CO6	(08)
	b)	State the importance of genetic Algorithms (GA) to the world of Artificial Intelligence. Discuss how you apply the three basic genetic operators on the case study of "Optimization with constraints: skill based employee allocation".	CO6	(12)
10.	a)	Identify any two tasks of computing which would be possibly solved by applying the philosophy of biological ants and explain the same.	CO6	(08)
	b)	Illustrate the role of Case Grammars and Conceptual Parsing in Natural Language processing. Use suitable examples to explain your answer.	CO6	(12)

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