

B.E./B.TECH. Degree Examination, December 2020

Semester – VI

CS16603 - ARTIFICIAL INTELLIGENCE

(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions

PART A - (8 X 2 = 16 marks)

1. The important issues is search are
 - A. Direction in which to search
 - B. Matching
 - C. Knowledge representation
 - D. All of the above
2. The one which is not included in the properties of knowledge representation is
 - A. Representational verification
 - B. Representational adequacy
 - C. Inferential adequacy
 - D. Inferential efficiency
3. The knowledge inference methods in semantic networks include
 - A. Intersection Search
 - B. Inheritance Search
 - C. None of the above
 - D. Both A & B
4. Linear planning does not require exponential amounts of work to verify the model truth criterion, but there will be exponential amounts of backtracking.
 - A. True
 - B. False
5. Differentiate informed and uninformed search techniques.
6. How is Question answering systems modeled?
7. What is the role of certainty factor in statistical reasoning?
8. How meta-knowledge is represented in rule-based expert systems?

PART B - (4 X16 = 64 marks)

9. (a) (i) Compare and contrast the advantage of Hill climbing and Simulated Annealing algorithms with suitable example. **(12)**
 - (ii) What are the limitations of minimax algorithm? How can it be improved? **(4)**

(OR)

- (b) Formulate the appropriate production rules with a good search strategy for the water jug problem. **(16)**

10. (a) (i) Construct semantic/ Partitioned semantic network for the given sentences: **(8)**

- Alex gave the green flowered vase to her favorite cousin
- Bob believes that pizza is tasty
- Charles believes that the earth is flat
- John gave a book to Alex.

- (ii) Construct frames for the following paragraph: **(8)**

Peter is a person. A person is a mammal. Persons have nose. Peter belongs to the team Brooklyn-Dodgers. Peter's uniform color is blue. Peter plays basketball. Peter's height is 172 cm.

(OR)

- (b) (i) Construct a script for the following paragraph: **(12)**

Jane was extremely hungry. She thought about going to her favorite restaurant for dinner, but it was the day before payday. So instead she decided to go home and pop a frozen pizza in the oven. On the way, though, she ran into her friend, Judy. Judy invited Jane to go out to dinner with her and Jane instantly agreed. When they got to their favorite place, they found a good table and relaxed over their meal. Also justify the advantages of using script knowledge representation for the above given scenario.

- (ii) Assess the operation of the unification algorithm on each of the following literals **(4)**

a) $f(\text{Marcus})$ and $f(\text{Caesar})$

b) $f(x)$ and $f(g(y))$

c) $f(\text{Marcus}, g(x, y))$ and $f(x, g(\text{Caesar}, \text{Marcus}))$

11. (a) (i) When is Fuzzy logic preferred in modeling AI system? Illustrate the working of Fuzzy inference system with an example. **(8)**

- (ii) Explain the approach of Dempster-Shafer theory to handle uncertainty in Knowledge. **(8)**

(OR)

- (b) (i) Assume the following facts: **(8)**
- Steve only likes easy courses.
 - Science courses are hard.
 - All the courses in the basket weaving department are easy.
 - BK301 is a basket weaving course.
- Justify “Steve likes basket weaving course” using the resolution inference technique.
- (ii) Compare and contrast the different knowledge inferencing methods. **(8)**
12. (a) (i) Examine how Winston’s learning program is used to learn the concept of “Arcs” in blocks world problem. **(8)**
- (ii) Describe how learning takes place in a backpropagation neural network **(8)**

(OR)

- (b) Design an expert system to be used by the physicians to identify the bacterial infections caused by bacteria like bacteremia and meningitis, and to recommend antibiotics to treat those infections. **(16)**