

VTU B.E/B.TECH QUESTION PAPER SET

CBCS SEMESTER V

ARTIFICIAL INTELLIGENCE

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15CS562

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Artificial Intelligence

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is Artificial Intelligence? List the task domains of Artificial Intelligence. (05 Marks)
 b. Explain Depth-First search algorithm with an example. (05 Marks)
 c. Explain Means-Ends analysis with an example. (06 Marks)

OR

- 2 a. A water jug problem states "you are provided with two jugs, first one with 4-gallon capacity and the second one with 3-gallon capacity. Neither have any measuring markers on it. How can you get exactly 2-gallons of water into 4-gallon jug?"
 i) Write down the production rules for the above problem.
 ii) Write any one solution to the above problem. (08 Marks)
 b. Explain problem characteristics with respect to heuristic search. (08 Marks)

Module-2

- 3 a. Explain property inheritance algorithm with example. (06 Marks)
 b. Write the algorithm for conversion to clause form. (10 Marks)

OR

- 4 a. Explain forward versus Backward Reasoning with examples. (08 Marks)
 b. List the issues in knowledge representation. (04 Marks)
 c. Define Horn clause and give the syntactic difference between PROLOG and logic. (04 Marks)

Module-3

- 5 a. Explain Dempster-Shafer theory with example. (06 Marks)
 b. Explain Partitioned Semantic Nets with example. (06 Marks)
 c. Briefly explain the motivation for fuzzy logic. (04 Marks)

OR

- 6 a. Explain Bayesian network in detail. (08 Marks)
 b. Write a note on Dependency-Directed Backtracking. (08 Marks)

Module-4

- 7 a. Define Conceptual Dependency. List the rules of conceptual dependency. (08 Marks)
 b. Write the algorithm for minimax (position, depth, players) and explain. (08 Marks)

OR

- 8 a. What is a script? What are the components of a script? Write the Restaurant Script. (10 Marks)
 b. Write the algorithm for: (i) Depth first iterative deepening (ii) Iterative deepening – A*. (06 Marks)

Module-5

- 9 a. Explain the different steps in natural language understanding process. (08 Marks)
 b. Explain candidate elimination algorithm with example. (08 Marks)

OR

- 10 a. Explain knowledge acquisition. (10 Marks)
 b. Explain the classification of spell checking techniques. (06 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
 2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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15CS562

Fifth Semester B.E. Degree Examination, Aug./Sept.2020
Artificial Intelligence

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Define Artificial Intelligence. Classify the task domains of Artificial Intelligence. (04 Marks)
b. List the properties of Knowledge. (04 Marks)
c. Discuss the production rules for solving the Water – jug problem. (08 Marks)

OR

- 2 a. Briefly discuss any four problems characteristics. (06 Marks)
b. Write an algorithm for i) Steepest – Ascent hill climbing with example. (10 Marks)
ii) Best – First search with example.

Module-2

- 3 a. Discuss any two approaches of Knowledge representation. (08 Marks)
b. Consider the following sentences :
i) John likes all kinds of food ii) Apples are food iii) Chicken is food
iv) Anything anyone eats and isn't killed by is food.
v) Bill eats peanuts and is still alive vi) She eats everything Bill eats.
Translate these sentences into formulas in predicate logic. (08 Marks)

OR

- 4 a. In brief, discuss forward and backward reasoning. (10 Marks)
b. Write a resolution algorithm for predicate logic. (06 Marks)

Module-3

- 5 a. Explain the two approaches of default reasoning. (10 Marks)
b. Define Baye's theorem. (06 Marks)

OR

- 6 a. Explain Bayesian Networks. (06 Marks)
b. What is semantic net? List the uses of semantic net. (05 Marks)
c. Construct partitioned semantic net representation of "Every batter hit a ball". (05 Marks)

Module-4

- 7 a. What is Conceptual Dependency (CD)? How do you represent Conceptual Dependency? (08 Marks)
b. What is Script? Write a script for ordering scene in restaurant. (08 Marks)

OR

- 8 a. Briefly explain minimax search procedure. (08 Marks)
b. Discuss iterative deepening and provide algorithm for depth first iterative deepening. (08 Marks)

Module-5

- 9 a. Explain the steps of natural language understanding process. (08 Marks)
b. Discuss the spell checking techniques. (08 Marks)

OR

- 10 a. Write a short note on : i) Rote learning ii) Learning by taking advice. (08 Marks)
b. How to built expert system efficiently? (08 Marks)

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17CS562

Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020
Artificial Intelligence

Time: 3 hrs.

Max. Marks: 100

Note: Answer FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the components and categories of production system. List the requirement of good control strategies. (10 Marks)
- b. Explain steepest Hill climbing technique with an algorithm. Comment on its drawbacks and how to overcome these drawbacks. (10 Marks)

OR

- 2 a. Consider trying to solve the 8-puzzle instance given below using Hill climbing. Apply any heuristic function appropriate to solve the problem. (10 Marks)

Start state			End state		
2	8	3	1	2	3
1		4	8		4
7	6	5	7	6	5

- b. List and explain the problem characteristics which must be analyzed before deciding on a proper heuristic search. (10 Marks)

Module-2

- 3 a. Consider the following sentences:
- John likes all kinds of food.
 - Apples are food.
 - Anything anyone eats and isn't killed by is food.
 - Bill eats peanuts and is still alive.
 - Sue eats everything Bill eats.
- (i) Translate all the sentences into formulas in predicate logic.
- (ii) Convert formulas from previous step into clause form.
- (iii) Prove that John likes peanuts using resolution. (12 Marks)
- b. Differentiate between forward and backward reasoning and list the factors that influences the choice between them. (08 Marks)

OR

- 4 a. Define CNF. Give an algorithm for converting given propositions to CNF. (10 Marks)
- b. Explain the different approaches used for knowledge representation and list the qualities a good knowledge representation system should possess. (10 Marks)

Module-3

- 5 a. Explain Justification based Truth Maintenance System (JTMS). What are the two critical criterion that must be met during labeling of JTMS and illustrate with suitable example. (10 Marks)
- b. What are partitioned semantic nets? Express the following quantified expression using semantic nets:
- (i) Every dog has bitten a mail carrier.
- (ii) Every dog in town has bitten the constable. (10 Marks)

1 of 2

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OR

- 6 a. What are the key issues in non-monotonic reasoning system? Explain the two approaches used for logic representation for non-monotonic reasoning. (10 Marks)
- b. Define Bayes theorem. What are its limitations? How certainty factor is used to overcome its limitation? (10 Marks)

Module-4

- 7 a. Explain the conceptual dependency representation of an event or action. (10 Marks)
- b. Explain MINMAX search with appropriate algorithm. (10 Marks)

OR

- 8 a. What is global ontology? What are the distinctions provided by Global ontology for defining a 'thing'? (10 Marks)
- b. What are scripts? Explain the important components of a script with an example. (10 Marks)

Module-5

- 9 a. Explain the usage of Soundex Algorithm for phonetic based spell checking with suitable example. (10 Marks)
- b. Write a note on knowledge acquisition. (10 Marks)

OR

- 10 a. List and explain the steps involved in natural language processing. (10 Marks)
- b. What is Analogy based learning? Differentiate between transformations analogy and derivational analogy. (10 Marks)

CBCS SCHEME

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17CS562

Fifth Semester B.E. Degree Examination, Aug./Sept. 2020

Artificial Intelligence

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Solve the following cryparithmetic problem DONALD + GERALD = ROBERT. (10 Marks)
b. Develop AO* algorithm for AI applications. (10 Marks)

OR

- 2 a. Solve water jug problem using production rule system. (10 Marks)
b. Explain problem characteristics with respect to heuristic search. (10 Marks)

Module-2

- 3 a. Consider the following set of well formed formulas in predicate logic :
i) Man (Marcus)
ii) Pompeian (Marcus)
iii) $\forall x : \text{Pompeian}(x) \rightarrow \text{Roman}(x)$
iv) Ruler (Caesar)
v) $\forall x : \text{Roman}(x) \rightarrow \text{loyalto}(x, \text{Caesar}) \vee \text{hate}(x, \text{Caesar})$
vi) $\forall x : y \text{loyalto}(x, y)$
vii) $\forall x, y : \text{Man}(x) \wedge \text{Ruler}(y) \wedge \text{tryassassinate}(x, y) \rightarrow \text{loyatto}(x, y)$
viii) Tryassassinate (Marcus, Caesar) (10 Marks)
b. Write the propositional Resolution algorithm. (10 Marks)

OR

- 4 a. Write the algorithm for conversion to clause form. (10 Marks)
b. Distinguish forward and backward reasoning with an example. (10 Marks)

Module-3

- 5 a. Propose implementation of DFS and BFS in the context of reasoning. (10 Marks)
b. Explain Bayesian Networks. (10 Marks)

OR

- 6 a. Explain certainty factors and rule based system in statistical reasoning. (10 Marks)
b. Explain property inheritance algorithm for frames. (10 Marks)

Module-4

- 7 a. Explain CYC. (10 Marks)
b. Explain conceptual Dependency along with its goals and representation. (10 Marks)

OR

- 8 a. Write the algorithm for minimax (position, depth, players) and explain. (10 Marks)
b. Write a note on global ontology. (10 Marks)

Module-5

- 9 a. Explain spell checking technique. (10 Marks)
b. Explain Winston's learning program. (10 Marks)

OR

- 10 a. Explain the Augmented Transition Network with an example. (10 Marks)
b. Explain three types of automated discovery systems in the context of learning. (10 Marks)

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