(Please write your Exam Roll No.) Exam Roll No. ...7.....

END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH] JANUARY-FEBRUARY 2023

Paper Code: IT-407 **Subject: Artificial Intelligence**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt five questions in all including Q.No.1. which is compulsory. Select one from each unit.

Q1. Attempt all questions. **(5x5=25)**

(a) What are the major hill climbing techniques?
(b) Why BFS is slower than DFS?
(c) What are the main parts of an Expert System? And, how they interact with one another.
(d) Explain the tic tac toe problem in artificial intelligence.
(e) What is first-order logic in artificial intelligence?

UNIT-I

Q2. (a) Show that DFS is neither complete nor optimal search. **(6.25)**

(b) What are the main aspects considered before solving a complex AI problem? What is state space representation in AI? **(6.25)**

Q3. (a) How state space strategy is useful in problem solving in AI? **(5)**
(b) In what situations is depth first search more efficient than breadth first search in problem solving for intelligent agents? **(4)**
(c) What do you mean by rule-based approach and learning based approach? **(3)**

UNIT-II

Q4. (a) Given an Initial state of an 8-puzzle problem and the final state to be reached.

Initial State

2	8	3
1	6	4
7		5

Final State

1	2	3
8		4
7	6	5

Find the most cost-effective path to reach the final state from the initial state using the A* Algorithm. **(6.25)**

(b) Differentiate between Uninformed and Informed Search technique. **(6.25)**

Q5. (a) Compare A* and AO * algorithms with each other. **(6.25)**

(b) Why sometimes unnecessary backward propagation occurs in AND OR graph. **(6.25)**

P.T.O.

UNIT-III

Q6. (a) Explain in detail Baysian Theory and its use in AI. **(5.5)**

(b) What is the difference between minimax and alpha-be ta pruning in game playing? **(4)**

(c) What is the purpose of a semantic network in knowledge representation? **(3)**

Q7. (a) What is the purpose of STRIPS partial order planning? **(6.25)**

(b) How do probabilistic reasoning systems differ from deterministic reasoning systems? **(6.25)**

UNIT-IV

Q8. (a) Explain the Application of AI in the following fields: **(2.5x4=10)**

(i) Environmental Science
(ii) Robotics
(iii) Aerospace
(iv) Medical Science

(b) What is the mathematical formula for calculating Gini impurity and information gain? **(2.5)**

Q9. (a) Define the concept of inductive learning and give an example of a decision tree. **(6.25)**

(b) How is inductive learning used in environmental science? **(6.25)**

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END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH.] NOVEMBER-DECEMBER- 2019

Paper Code: IT-407 **Subject: Artificial Intelligence**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt any five questions including Q.No 1 which is compulsory.

Q 1 Answer the following questions:-**(Any five)** **(5x5=25)**

(a) Discuss various problem characteristics with examples.
(b) What do you mean by Intelligent Agents? Give types and examples.
(c) What do you mean by Overestimation and underestimation? How can this be solved?
(d) What are Expert systems? Give one example.
(e) What do you mean by computational based leaning? Explain.
(f) Explain A* algorithm in brief.

Q 2 (a) Explain Unification Algorithm with a suitable example. **(10)**
(b) Differentiate between Propositional & Predicate Logic. **(2.5)**

Q 3 Define State Space of a problem. What do you mean by Production System? Define "Water Jug "problem and write the production rules for the same. **(12.5)**

Q4 (a) Explain Simulated Annealing with an example? **(9.5)**
(b) What are informed and uninformed search techniques? **(3)**

Q 5 (a) Explain mini-max search procedure and alpha- beta cutoffs. **(8.5)**
(b) Explain constraint satisfaction problem. **(4)**

Q 6 (a) What are Bayesian Networks? **(3)**
(b) Differentiate between Partial Order and Total Order Planners? **(3)**
(c) Write the POP (Partial Order Planning) Algorithm. **(6.5)**

Q 7 (a) How do we find a decision tree that agrees with the training. **(4)**
(b) What if a decision tree is too large? Can we approximate with smaller trees? **(4.5)**
(c) What is Conditional Entrophy? **(4)**

Q 8 Write short notes on the following:
(a) Heuristic Search and Heuristic Function **(4.5)**
(b) Knowledge representation techniques **(4)**
(c) Iterative Deepening **(4)**

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END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH/M.TECH] DECEMBER 2018

Paper Code: IT-407 **Subject: Artificial Intelligence**

Time: 3 Hours **Maximum Marks: 75**

Note: Attempt any five questions including Q.no.1 which is compulsory.

Q1 Attempt following in brief: **(any five)** **(5x5=25)**

(a) What is alpha-beta pruning? What are the two commitments of logic? Define them?
(b) Explain genetic algorithm as a local search.
(c) Explain any two local search algorithms in detail.
(d) Explain Memory bounded heuristic search in detail.
(e) Explain simulated annealing search in detail.
(f) Explain Hill climbing in detail.
(g) Explain iterative deepening.

Q2 (a) What are the components of a first order logic? What is the difference between the two quantifiers in the logics? **(4)**
(b) What is synchronic and diachronic? What are casual rules? **(4)**
(c) What are diagnostic rules? What is a model based reasoning systems? **(4.5)**

Q3 (a) What are the types of learning? **(4)**
(b) What is an ensemble learning? Give a simple mathematical model for a neuron. **(4)**
(c) What are the two choices for activation function? What are the categories of neural network structures? **(4.5)**

Q4 (a) With reference to search algorithm, explain the following terms: **(4)**

1) Problem Space
2) Problem Instance
3) Problem Space graph
4) Depth of a problem
5) Space Complexity
6) Time Complexity
7) Admissibility
8) Branching Faceto

(b) Compare the performance of Breadth First, Depth First, Bidirectional, Uniform Cost and Interactive Deepening methods for search in terms of Time, Space, Optimality, and Completeness. **(4)**
(c) What are the disadvantages associated with Brute-Force Search Strategies? **(4.5)**

Q5 (a) Explain A* algorithm in brief for path finding and graph traversal, **(4)**
(b) What are the various methods for graph traversal? Discuss in brief. **(4)**
(c) Explain the functioning of probabilistic reasoning system. **(4.5)**

Q6 (a) How chart-parsing algorithm resolve the problems of ambiguity? Give example. **(4)**
(b) How the grammar is augmented when it is expressed using features? Explain. **(4)**
(c) Elaborate on the semantic augmentations for an English fragment including tense, quantification and pragmatic interpretation **(4.5)**

P.T.O

IT-407

Q7 (a) Explain Learning decision trees. Create the leftmost decision tree for the following production rules. **(4)**

skips ←*long*.
reads ←*short*∧*new*.
reads ←*short*∧*follow Up*∧*known*.
skips ←*short*∧*follow Up*∧*unknown*.

(b) How should an agent go about building a decision tree? Can rules be skips or reads be omitted? Why negation is considered as failure? **(4)**

(c) If a decision tree can be incrementally built from the top down by recursively selecting a feature to split, then what are the basis for selecting these features? **(4.5)**

Q8 Write short note on following **(any three)**: **(4+4+4.5)**

(a) Expert system
(b) Use of AI in Aero-space
(c) Entropy and Information gain
(d) Robotics

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END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH./M.TECH.] DECEMBER 2017

Paper Code: IT-407 **Subject: Artificial Intelligence**

Time: 3 Hours **Maximum Marks: 60**

Note: Attempt any five questions including Q.no.1 which is compulsory. Select one questions from each Unit.

(2x10=20)

Q1 (a) Define an agent.
(b) Differentiate Uniformed Search (Blind search) and Informed Search (Heuristic Search) strategies.
(c) How knowledge is represented in an AI based system?
(d) What is forward chaining and backward chaining?
(e) What is an Ontology?
(f) What is greedy best first search?
(g) What are the problems faced by a local search algorithm?
(h) How agents do communication?
(i) Define Minimax Search procedure.
(j) Define Baye's Theorem.

Unit-I

Q2 Discuss the following search Technique with the help of an example. Also discuss the benefits and shortcoming of each. (10)
(a) Breadth First Search.
(b) Depth First Search.

Q3 Define the heuristic search. Discuss following heuristic search techniqus. (10)
(a) Hill Climbing
(b) Problem Reduction (AO Algorithm)

Unit-II

Q4 What is production system? Explain it with an example. Discuss the characteristics of a production system. (10)

Q5 Illustrate A* Search Technique through an example. (10)

Unit-III

Q6 Discuss various approaches and issues in knowledge representation. Also discuss various problems in representing knowledge. (10)

Q7 Write unification algorithm and explain resolution in predicate logic. (10)

Unit-IV

Q8 Define Inductive learning and illustrative decision tree through an example. (10)

Q9 Explain any two applications of artificial intelligence in detail in the area of science and technology. (10)

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END TERM EXAMINATION

SEVENTH SEMESTER [B.TECH./M.TECH.] DEC.2014 – JAN.2015

Paper Code: IT407 **Subject: Artificial Intelligence**

Time : 3 Hours **Maximum Marks :60**

Note: Attempt any five questions including Q.no.1 which is compulsory.

Q1 Short answer type questions:- **(2.5x8=20)**

(a) Differentiate between search space and state space.
(b) What is a heuristic search technique?
(c) What are the differences between forward chaining and backward chaining?
(d) What basic functions or operations must a program perform in order to access knowledge?
(e) List the advantages and disadvantages of Depth first search algorithm.
(f) Explain intersectional search in semantic nets.
(g) Define inheritable knowledge.
(h) What is the purpose of decision trees?

Q2 Write and describe A* algorithm with suitable example. **(10)**

Q3 Explain the following in predicate logic:- **(10)**

(a) Vijay was a player.
(b) Ajay was an Indian.
(c) All men are mortal.
(d) The volcano erupted in 1890.
(e) No mortals live longer than 150 years.

Q4 Explain the following sentences using semantic net:- **(10)**

(a) Ram is taller than Mohan.
(b) My chair is blue.
(c) Ram gave a book to Shyam.
(d) Mohan is 5 feets and wear a coat.
(e) Singh is an actor.

Q5 (a) Convert the following well-formed formula to clause form:- **(5)**

$\neg$Indian(x) $\vee$ know(x, Shyam) $\vee$ hate(x, Raj) $\vee$ hate(y,z) $\vee$ thinkcrazy(x,y).

(b) What are the qualities of a good knowledge representation system? **(5)**

Q6 What is Expert System? Discuss its various parts and the concept of uncertainty. **(10)**

Q7 Write a set of STRIPS-style operators that might be used for devising a plan for cleaning the kitchen taking into account following considerations:- **(10)**

(a) Cleaning the stove or refrigerator will get the floor dirty.
(b) To clean the oven, it is necessary to apply the oven cleaner and then to remove the cleaner.
(c) Before the floor can be washed, it must be swept.
(d) Before the floor can be swept, the garbage must be taken out.
(e) Cleaning up the refrigerator generates garbage and messes up the counters.
(f) Washing the counters or the floor gets the sink dirty.

Q8 What are the various learning techniques? Explain. **(10)**

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