

IV B.Tech. II Semester Supplementary Examinations, July -2005
ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS

Electronics and Control Engineering

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. (a) What do you mean by heuristic? Discuss the role of heuristic information in a search process.
(b) Explain the following with an example
 - i. commutative production
 - ii. problem decomposition
2. (a) Explain with an algorithm the breadth method of searching a problem tree.
(b) Explain the travelling salesman problem. Show how this problem can be represented so that it can be solved by a production system.
3. (a) Draw a semantic network representation for the following sentences.
 - i. Brick is red colored cubical material
 - ii. Shark is a fish that has teeth and likes blood. Cod is a fish that is edible. All fishes are animals.
(b) Explain monotonic reasoning method with an example.
4. (a) Explain semantic network with suitable examples. Discuss any one method of transforming predicate form of semantic network.
(b) With an example explain the theory of conceptual dependency.
5. (a) Explain how images are recognized and list the various methods of recognition.
(b) How AI is used in medical diagnosis? Explain any one medical diagnosis system.
6. (a) Explain the components of an expert system.
(b) What is a rule based system? Mention and discuss the features of the different component of a rule based system.
7. (a) Explain the AI system architecture with necessary block diagram.
(b) What are the important characteristics of LISP and PROLOG.
8. Write short notes on:
 - (a) AI application
 - (b) Neural Network
 - (c) Probabilistic reasoning

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Set No.1

(d) Speech recognition system.

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1. (a) What do you mean by intelligence? Distinguish between artificial intelligence and natural intelligence. Mention the different sub-domains of AI.
(b) With suitable example discuss the state space search method of problem solving.
2. (a) Explain with an algorithm the breadth method of searching a problem tree.
(b) What are FRAMES? Discuss FRAME method of knowledge representation.
3. Consider the following sentences:
John likes all kinds of food.
Apples are food
Chicken is food
Anything any one eats and is not killed by is food
Tom eats every thing Bill eats
Bill eats peanuts and is still alive.
(a) Translate the above sentences into formulae in predicate logic
(b) Convert the formulae into clause form
(c) Prove that John likes peanuts using resolution
(d) Use resolution to answer. What food does Tom eat.
4. (a) Explain monotonic reasoning method with an example
(b) Explain with an example the theory of conceptual dependency.
5. (a) What is syntactic ATN? With suitable example explain.
(b) Explain how images are recognized and give the various methods for recognition.
6. (a) With the aid of an example explain the key-word matching method of understanding single natural language sentences.
(b) What are the characteristics of AI languages? Explain them with respect to LISP.
7. (a) With the block diagram explain the functions of expert system.
(b) What is rule based system? Mention and discuss the features of the different components of a rule bases system.

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Set No.2

8. Write short notes on:

- (a) Learning
- (b) Computer vision
- (c) Production system
- (d) PROLOG.

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1. (a) Explain the model of AI with suitable example.
(b) Explain the backtracking search strategies with an example and algorithms.
2. (a) Explain the theory of underlying A* method of searching a problem graph.
(b) Explain the following:
 - i. Predicate logic
 - ii. Quantifiers.
3. (a) What are the different types of knowledge that are to be taken into consideration while developing a knowledge based system? Explain.
(b) How is knowledge represented in the form of a script? Represent the knowledge contained when a person goes to a drama theatre.
4. (a) Explain semantic networks with suitable example. Discuss any one method of transforming predicate form of semantic network.
(b) What are associative networks? Explain two relationships with example.
5. (a) What do you mean by natural language processing? Explain the various problems encountered in NLP.
(b) With an example explain the key-word matching method of understanding natural language sentences.
6. (a) How AI is used in medical diagnosis? Explain briefly any two methods.
(b) With an example explain the theory of conceptual dependency.
7. (a) What is expert system? Explain with suitable example.
(b) What are the important characteristics of AI languages? Explain briefly the components of AI program.
8. Write short notes on :
 - (a) Learning in AI
 - (b) Satellite imaging
 - (c) Neural network
 - (d) Hill climbing.

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1. (a) Define a production system. Explain the components of a production system.
(b) Explain the following with an example:
 - i. Commutative production
 - ii. Problem decomposition
2. (a) What do you mean by heuristics? Explain its importance in a search process. Mention its various methods available for searching a problem tree.
(b) With an algorithm explain the breadth method for searching a problem.
3. (a) Draw a semantic network representation for the following sentences
 - i. Brick is red coloured cubical material
 - ii. Shark is a fish that has teeth and likes blood. Cod is a fish that is edible
All fishes are animals.
(b) Explain associative network for knowledge representation.
4. (a) Distinguish between monotonic and non-monotonic reasoning.
(b) Explain probabilistic reasoning with an example.
5. (a) With an example explain the theory of conceptual dependency.
(b) Explain the difficulties in NLP. How are they overcome.
6. (a) Explain how AI is used in Robotics?
(b) Explain the different components of an expert system.
7. (a) Explain why PROLOG interpreter running a PROLOG program can not be used to prove the negation of an atom.
(b) What are the merits and demerits of LISP?
8. Write short notes on:
 - (a) Learning in AI
 - (b) Satellite imaging
 - (c) Neural Network
 - (d) Hill climbing.
