CS6659 ARTIFICIAL INTELLIGENCE

Question Bank

Unit-I

UNIT – I: INTRODUCTION TO AI AND PRODUCTION SYSTEMS

Part A

1. What is Intelligence?

2. Describe the four categories under which AI is classified with?

3. Define Artificial Intelligence.

4. List the fields that form the basis for AI.

5. What is a Knowledge Based System?

6. List few of the task domains of AI.

7. Give the components of a KBS

8. Describe meta-knowledge?

9. Give the expansion of LISP and PROLOG

10. Interpret the meaning of a Production System.

11. Illustrate the definition of state-space search technique.

12. Show the steps involved in performing a state-space search.

13. Demonstrate the meaning of heuristic search

14. Compare Informed & Uninformed search with examples

15. Analyze the logic behind– Hill climbing, Best-First Search, BFS and DFS.

16. Analyze the meaning of means-end analysis.

17. Deduce the various problem characteristics.

18. Assess when hill climbing fails to find a solution?

19. Formulate the ways to overcome hill climbing problems.

20. Prepare the requirements of a good control strategy.

Part B

1. Describe briefly the various problem characteristics?

2. Identify the problems encountered during hill climbing and list the ways available to deal with these problems?

3. Describe the process of simulated annealing with example?

4. Discuss A* and AO* algorithm and the various observations about algorithm briefly?

6. Illustrate in detail about the constraint satisfaction procedure with example?

7. Show how the steepest accent hill climbing works?

8. Explain in detail about the mean end analysis procedure with example?

9. Evaluate a problem as a state space search with an example?

10. Prepare the merits and demerits of depth-first and breadth-first search with the algorithm?

Unit-II
REPRESENTATION OF KNOWLEDGE
Part A

1. How predicate logic is helpful in knowledge representation.

2. Define semantic networks

3. Identify the need of facts and its representation?

4. Describe property inheritance?

5. Tell briefly about ISA and Instance classes

6. Identify some use of conceptual dependency

7. Discuss FOL with an example

8. Give the definition of Horn clause.

9. Discuss uniqueness quantifier

10. Give the definition of Canonical horn clause

11. Show the difference between propositional and FOL logic

12. Illustrate the meaning of Game Playing

13. Analyse the definition of logic

14. Infer the definition of unification

15. Analyse clausal form and its usefulness

16. Deduce alpha & beta values in a game tree

17. Explain some of the knowledge representation techniques

18. Compose a well-formed formula (wff).

19. Compose the meaning of resolution/refutation?

20. Show the components of Game software

Part B

1. a. Describe the Issues in knowledge representation

   b. Describe alpha beta pruning procedure

2. How would the minimax procedure have to be modified to be used by a program playing a three or four-person game rather than two –person one?

3. Describe how will you represent facts in propositional and predicate logic with an example

4. Discuss Resolution in brief with an example

5. Give algorithm for propositional resolution and Unification algorithm

6. Illustrate in detail about forward and backward chaining with suitable example.

7. Discover the operation of the unification algorithm on each of the following pairs of literals:

   A. f(Marcus)and f(Caesar)

   B. f(x) and f(g(y))

   C. f(Marcus,g(x,y))and f(x,g(Caesar,Marcus))

8. Explain in detail about structured representation of knowledge

9. Explain about conversion to clause form algorithm in detail

10. Invent what is wrong with the following arguments a.   Men are widely distributed over the earth

    b.   Socrates is a man

    c.   Therefore, Socrates is widely distributed over the earth Design.

Unit-III

KNOWLEDGE INFERENCE

Part A

1. Define Bayes theorem

2. What do you mean by Rule based system?

3. What is inference?

4. List some of the rules of inference

5. What are knowledge based agents

6. What is credit assignment problem?

7. Give the definition of Frame problems

8. Express the meaning of fuzzy logic and its usage

9. Interpret plausible-move generator and give its role

10. Express Certainty factor in your words

11. Illustrate frames? How do they differ from semantic nets.

12. Demonstrate the frame manipulation primitives

13. Illustrate MYCIN style rule

14. Analyse scripts and its use.

15. Differentiate the forward and backward chaining.

16. Deduce Bayesian networks with an example

17. Assess entailment?

18. Design goal directed model.

19. Formulate dumpster Shafer theory

Part B

1. How does an inference engine work in frame based system?

2. What is certainty factor? How will you find it in various

3. Distinguish between production based system and frame based s y s t e m .

4. Discuss Bayesian Network in detail

5. Dempster-Shafer computations were given for four terrorist organizations A,B,C and D. Suppose now that new evidence (m3) indicates that organization C was indeed responsible to a degree of 0.8. This requires that values for m3.m4 be computed, where m4=m1+m2. Compute a new intersection tableau for the new evidence, that is compute m3(C) and m3(U) versus m4(A),m4(C,A), m4(A,B,D), and m4(U).

6. Differentiate forward chaining and backward chaining with suitable example

7. Discuss in detail about dempster shafter theory.

8. a. Explain in detail about frames representation.

   b. Write short note on fuzzy reasoning, Bayesian probability, and certainty factors

9. Compute certainty factor based on hypothesis

10. Consider the following: A pea is placed under one of the three shells, and the shells are then manipulated in such a fashion that all three appear to be equally likely to contain the pea. Never less, you win a prize if you guess the correct shell, so you make a guess. The person running the game does know the correct shell, however, and uncovers one of the shells that you did not choose and that is empty. Thus, what remains are two shells: one you choose and one you did not choose. Furthermore, since the uncovered shell did not contain the pea, one of the two remaining shells does contain it. You are offered the opportunity to change your selection to the other shell. Should you? Work through the conditional probabilities mentioned in this problem using Bayes theorem. What do the results tell about what you should do?

Unit-IV

PLANNING AND MACHINE LEARNING

Part A

1. Define planning?

2. Examine nonlinear plan.

3. List the components of planning system?

4. What is learning? What are its types?

5. What is Explanation Based Learning? How is it useful?

6. Define Inductive Bias

7. Where the Samuel's program is used

8. Explain rote learning

9. Define generalization

10. Explain credit assignment problem 11.Define STRIPS

12. State Winston's Learning Program

13. State Candidate elimination algorithm

14. Give the general framework of EBL programs

15. List the steps involved in EBG algorithm

16. State derivation analogy

17. Define clustering

18. How AM discovered prime numbers using heuristic

Part B

1. Explain various axioms of probability.

2. Explain in detail about Bayes' Rule and Its Use.

3. Explain the Semantics of Bayesian Networks.

4. Explain how inference can be achieved in Bayesian Networks.

5. Explain in detail about Hidden Markov Models.

7. Explain how bayesian statistics provides reasoning under various kinds of uncertainty

8. Explain the method of hidden markov models in speech recognition.

9.Explain the method of handling approximate inference in Bayesian networks.

Unit-V

ANALYSIS AND VALIDATION

Part A

1. What are Expert Systems?

2. List the characteristic features of a expert system

3. What is the need for expert system tool while building expert system?

4. Mention some of the key applications of ES

5. Briefly explain the knowledge acquisition process

6. Explain MOLE

7. Explain Propose and revise strategy

8. What are the applications of EMYCIN

9. What are the applications of EXPERT?.

10. What are the typical components of an expert system support environment?

11. What is the use of expert system tools?

12. Name the programming languages used for expert system applications?

13. What are the types of tools available for expert system building?

14. Name the programming methods supported by expert system tools?

15. What are the knowledge representations supported by expert system tools?

16. What are the pitfalls in dealing with the domain expert?

17. Where is expert system work being done?

18. Explain XCON?

19. Name any three universities and mention the expert system tools developed there?

20. Name any three research organization and mention the expert system tools developed there?

Part B

1. What is an expert system shell

2. What are common pitfalls in planning an expert system?

3. What is knowledge acquisition? Explain in detail

4. Discuss briefly about Meta knowledge

5. Discuss briefly about the EMYCIN in detail

    a. Illustrate Heuristics with an example

    b. Classify the XOON and DART in detail and write its applications.

6. Draw the schematic diagram of an expert system. Explain all the relevant components

7. a. Explain the various stages of expert system development?

    b. Explain the tasks involved in building expert system?

8. a. Explain the role of knowledge engineer, domain expert and an end user in an expert system

    b. Explain the difficulties involved in developing an expert system

9. Solve expert system problem in terms of knowledge representation, knowledge acquisition and explanation. Give one domain in which the expert system approach would be more promising

10. a.Illustrate Heuristics with an example

    b. Classify the XOON and DART in detail and write its applications.