

ARTIFICIAL INTELLIGENCE-Question Bank

SUBJECT NAME : ARTIFICIAL INTELLIGENCE

SUBJECT CODE : CS2351

YEAR/SEM :III / VI

UNIT I PROBLEM SOLVING

PART-A

1. What is Intelligence?
2. Describe the four categories under which AI is classified with examples.
3. Define Artificial Intelligence.
4. List the fields that form the basis for AI.
5. What is a Knowledge Based System? Explain.
6. List a few of the task domains of AI.
7. Describe the components of a KBS.
8. What is meta-knowledge?
9. Expand LISP and PROLOG.
10. What is a Production System?
11. Define state-space search technique.
12. List the steps in performing a state-space search.
13. What is heuristic search?
14. Differentiate Informed & Uninformed search. Give examples.
15. Define the logic behind –Hill climbing, Best-First Search, BFS and DFS.
16. What do you mean by Game Playing?
17. What are the components of a Game software?
18. What is a plausible-move generator? What is its role?
19. Define alpha & beta values in a game tree.

20. Mention some of the knowledge representation techniques.

PART-B

1) What are the four basic types of agent program in any intelligent system? Explain how did you convert them into learning agents?. (16)

2) Explain the following uninformed search strategies with examples.

(a) Breadth First Search. (4)

(b) Uniform Cost Search (4)

(c) Depth First Search (4)

(d) Depth Limited Search (4)

3) What is PEAS? Explain different agent types with their PEAS descriptions. (16)

4) Explain in detail the properties of Task Environments. (16)

5) Define a problem and its components. Explain how a problem solving agent works? (16)

6) Explain real-world problems with examples. (16)

7) Explain in detail with examples

(i) Iterative deepening search (8)

(ii) Bidirectional search (8)

8) How an algorithm's performance is evaluated? Compare different uninformed search strategies in terms of the four evaluation criteria. (16)

UNIT II LOGICAL REASONING

PART-A

1. Differentiate propositional & predicate logic.

2. What is clausal form? How is it useful?

3. Define a well-formed formula (wff).

4. List some of the rules of inference.

5. What is resolution / refutation?

6. Define unification.

7. What are semantic nets?

8. What are frames? How do they differ from semantic nets.

9. What are script? What is its use?
10. List the components of a script.
11. Mention the frame manipulation primitives.
12. Define forward and backward chaining. Differentiate the same.
13. What is means-end analysis?
14. Mention the strategies used in resolving clauses (unit-preference, set-of-support, best first)

PART-B

- 1) What is Greedy Best First Search? Explain with an example the different stages of Greedy Best First search. (16)
- 2) What is A* search? Explain various stages of A* search with an example. (16)
- 3) Explain in detail with examples
 - (i) Recursive Best First Search(RBFS) (8)
 - (ii) Heuristic Functions (8)
- 4) Explain the following local search strategies with examples.
 - (i) Hill climbing (4)
 - (ii) Genetic Algorithms (4)
 - (iii) Simulated annealing (4)
 - (iv) Local beam search (4)
- 5) Define constraint satisfaction problem (CSP). How CSP is formulated as a search problem? Explain with an example. (16)
- 6) Explain with examples
 - (i) Constraint graph (4)
 - (ii) Cryptarithmic problem (4)
 - (iii) Adversarial search problem (4)
 - (iv) Game (4)
- 7) Explain with algorithm and example :
 - i. Minimax algorithm (8)
 - ii. Alpha-Beta Pruning (8)

UNIT – III

PART-A

1. Describe Bayes theorem.
2. What are the disadvantages of Closed World Assumption (CWA). How will you over- come it?
3. Define Non monotonic reasoning.
4. What are Truth Maintenance Systems? Draw its block diagram.
5. What are Bayesian networks? Give an example.
6. What is fuzzy logic? What is its use?
7. How Knowledge is represented?
8. What is propositional logic?
9. What are the elements of propositional logic?
10. What is inference?
11. What are modus ponens?
12. What is entailment?
13. What are knowledge based agents?

PART-B

- 1) (i) Define the syntactic elements of first-Order logic (8) (ii) Illustrate the use of first-order logic to represent knowledge. (8)
- 2) Explain the steps involved in the knowledge Engineering process. Give an example. (16)
- 3) Explain with an example
(a) forward chaining (8) (b) Backward chaining (8)
- 4) Give resolution proof for example problem statement :
(a) "West is a criminal" (8) (b) Curiosity killed the cat (8)
- 5) What is Ontological Engineering? Explain with the diagram the upper ontology of the world. (16)
- 6) How categories are useful in knowledge representation. (16)
- 7) What is situation calculus? Explain the ontology of situation calculus. (16)
- 8) What is a frame problem? (4) How do you solve the following problems in situation calculus?
(a) Solving the representational frame problem (6)

(b) Solving the inferential frame problem (6)

9) Write short notes on

(a) Event calculus (4)

(b) Generalized events (4)(c) Intervals (4)

(d) Fluents and objects (4)

10) Explain in detail the shopping agent for the Internet shopping world example. (16)

Unit IV

Part A

1. Define linguistics. List the general classification of languages.
2. Construct parse trees for given sentences.
3. What are grammars?
4. Give the syntactic tree for the sentence „The boy ate the apple.“
5. List the types of grammars.
6. What is parsing? What is its importance?
7. Differentiate – Top down & Bottom Up parsing, Deterministic & Non deterministic parsing,.
8. What are Recursive transition networks (RTN), Augmented Transition Networks (ATN)?
9. What is the role of semantic analysis in NLP?
10. Define Natural Language generation.
11. List any two NLP systems.
12. What is distributed reasoning?
13. What are Intelligent Agents? What are its use?

PART-B

- 1) What are the components of agents? (16)
- 2) Define and explain (i) Supervised learning (6) (ii) Unsupervised learning (6) (iii) Reinforcement learning (4)
- 3) How hypotheses formed by pure inductive inference or induction? Explain with ex - amples. (16)

- 4) (a) What is a decision tree? (4)
- b) Explain the process of inducing decision trees from examples. (6)
- c) Write the decision tree learning algorithm (6)
- 5) How the performance of a learning algorithm is assessed? Draw a learning curve for the decision tree algorithm (16)
- 6) Explain with an example
- (a) Ensemble learning (4)
- (b) Cumulative learning process (4)
- (c) Relevant based learning(RBL) (4)
- (d) Inductive logic programming (4)
- 7) What is explanation based learning? Explain in detail with an example. (16)
- 8) What is Inductive Logic Programming? Write FOIL algorithm for learning sets of first- order horn clauses from example. (16)
- 9) Discuss on learning with hidden variables : the EM algorithm. (16)
- 10) What is reinforcement learning? Explain (a) Passive reinforcement learning (b) Active reinforcement learning (16)

UNIT – V

PART-A

1. What are Expert Systems?
2. Briefly explain the knowledge acquisition process.
3. List the characteristic features of a expert system.
4. Mention some of the key applications of ES.
5. What is learning? What are its types?
6. Define generalization.
7. Define Inductive Bias.
8. What is Explanation Based Learning? How is it useful?

PART-B

- 1) Define the terms a) Communications (b) Speech act (c) Formal Language and (d) Grammar (16)
- 2) What are the component steps in communication? Explain the steps for the example sentence "The wumpus is dead" (16)
- 3) Construct a lexicon and grammar for a small fragment of English Language. (16)
- 4) What is parsing? Explain in detail two parsing methods and give a trace of a bottom up parse on the string "The wumpus is dead" (16)
- 5) What is augmented grammar? Explain with examples
 - (a) Verb sub categorization (8)
 - (b) Semantic interpretation (8)
- 6) Discuss ambiguity and disambiguation. (16)
- 7) What is Grammar induction? Explain with an example (16)
- 8) Explain in detail
 - (a) Information Retrieval (8)
 - (b) Information Extraction (8)
- 9) What is machine translation? What are different types of machine translation? (16)
- 10) Draw the schematic of a machine translation and explain for an example problem (16)