

(2 1/2 Hours)

[Total Marks: 75]

- N.B. 1) All questions are compulsory.
 2) Figures to the right indicate marks.
 3) Illustrations, in-depth answers and diagrams will be appreciated.
 4) Mixing of sub-questions is not allowed.

Q. 1 Attempt All (Each of 5Marks)**(15)**

- (a) 1. _____ is not a component of node structure
 a) state b) Parent
 c) child d) Action
2. _____ is also called as Heuristic search
 a) Uninformed search b) informed search
 c) Depth Limited Search d) uniform cost search
3. _____ agent does not maintain internal state.
 a) Model based b) Goal -based
 c) Simple reflex d) Utility-based
4. If a hypothesis agrees with all the data, it is called as.....
 a) consistent hypothesis b) Integral hypothesis
 c) best hypothesis d) Regular hypothesis
5. . The most widely used ensemble method is called _____
 a) Bayesian Learning b) Online learning
 c) Boosting d) Support Vector Machine.

(b) Fill in the blanks.

(Decision List, omniscient, Single, Regularization, Parameter Learning)

1. A decision tree returns a _____ output value.
2. _____ is finding the numerical parameters for a probability model whose structure is fixed.
3. This process of explicitly penalizing complex hypothesis is called _____.
4. _____ agent knows the actual outcome of its actions and can act accordingly.
5. _____ consists of series of tests, each of which is a conjunction of literals.

(c) Short Answers(Unit-I, II and III)

1. What is early stopping?
2. Define Error Rate.
3. How denote learning rate?
4. Define decision boundary.
5. What is triangle inequality?

Q. 2 Attempt the following (Any THREE)(Each of 5Marks) (15)

- (a) Describe Model-based agent.
- (b) What is PEAS? Mention it for Part picking robot and Medical Diagnosis system.
- (c) Explain Artificial Intelligence with Turing Test approach.
- (d) Describe problem formulation of vacuum world problem.
- (e) Explain these properties of task environment.
 - 1. Deterministic vs. Stochastic
 - 2. Fully observable vs. partially observable
- (f) List and explain the categories of definition of AI.

Q. 3 Attempt the following (Any THREE) (Each of 5Marks) (15)

- (a) Explain the concept of Locality Sensitive Hashing.
- (b) Write a note on Artificial Neural Network.
- (c) Explain K-fold cross validation and LOOCV.
- (d) Write a note on Supervised Learning.
- (e) What is entropy? How do we calculate it?
- (f) Write a note on Nearest Neighbor model.

Q. 4 Attempt the following (Any THREE) (Each of 5Marks) (15)

- (a) Explain the concept of Passive Reinforcement Learning.
- (b) Write a note on Statistical Learning.
- (c) Explain Hidden Markov Model.
- (d) Briefly explain the concept of direct utility estimation.
- (e) What are the applications of Reinforcement Learning?
- (f) Explain the concept of EM algorithm.

Q. 5 Attempt the following (Any THREE) (Each of 5Marks) (15)

- (a) Explain Breadth First Search strategy along with its pseudocode.
- (b) Write a note on Decision Tree. Also describe its pruning technique.
- (c) Explain Naïve Bayes Model.
- (d) Explain the concept of Goal Based Agent.
- (e) Write a note on overfitting in decision tree.