

(2 ½ Hours.)

[Total Marks: 75]

- N. B.:** (1) All questions are compulsory.  
 (2) Make suitable assumptions wherever necessary and state the assumptions made.  
 (3) Answers to the same question must be written together.  
 (4) Numbers to the right indicate marks.  
 (5) Draw neat labelled diagrams wherever necessary.  
 (6) Use of non-programmable calculators is allowed.

**1. Attempt any four of the following:**

20

- Describe an agent structure in detail.
- Explain following task environments.
  - Discrete Vs Continuous
  - Known Vs Unknown
- What is Heuristic function? Explain A\* search Algorithm.
- What is PEAS? Explain with two suitable examples.
- Describe working of Utility based agent.
- Describe the best first search algorithm in detail.

**2. Attempt any four of the following:**

20

- Differentiate between Supervised & Unsupervised Learning.
- Write a short note on support vector machine.
- What is Ensemble learning? How bagging algorithm works?
- Explain the Decision tree learning algorithm in detail.
- Describe K-fold cross validation and LOOCV.
- What is Artificial Neuron? Explain in detail working of ANN.

**3. Attempt any four of the following:**

20

- Explain Hidden Markov Model in detail.
- Write a short note on temporal difference learning.
- Explain Maximum-likelihood parameter learning for Continuous models.
- Discuss Active & Passive Reinforcement Learning.
- Describe Naïve Bayes algorithm in detail.
- What is linear Regression? State its types.

**4. Attempt any five of the following:**

20

- State the applications of Reinforcement learning.
- What is EM algorithm? What are its steps?
- Explain single-layer feed forward neural networks.
- What is Entropy & Information Gain?
- Briefly explain Goal based agent in detail.
- What is Statistical Learning?