(21/2 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**

a. Define AI in four Quadrants. State its history.
b. Explain following task environments.
   1. Static Vs. Dynamic
   2. Deterministic Vs. Stochastic
c. What is a Heuristic function? State its characteristics.
d. What is PEAS? Give PEAS description for Part Picking Robot & Medical Diagnosis System.
e. Describe the structure of an AI Agent.
f. Describe the Depth-First Search algorithm in detail.

2. Attempt any four of the following: **20**

a. State the various terminologies used in Artificial Neural Networks.
b. Differentiate between Classification & Regression with examples.
c. What is Logistic regression? State its applications with examples.
d. Explain the Decision tree learning algorithm in detail.
e. Describe K-fold cross validation and LOOCV.
f. Differentiate between Supervised & Unsupervised Learning.

3. Attempt any four of the following: **20**

a. Describe Hidden Markov Model (HMM) in detail.
b. Write a short note on temporal difference learning.
c. Explain in brief the EM Algorithm.
d. State the applications of Reinforcement learning.
e. What is Active & Passive Reinforcement Learning?
f. Describe Naïve Bayes algorithm in detail.

4. Attempt any three of the following: **15**

a. What is the concept of policy search?
b. Explain feed-forward & feed-back neural networks.
c. What is Entropy & Information Gain?
d. Describe the working of Goal based agents in detail.
e. What is A* search technique? Explain with an example.
f. Compare & Contrast between Linear & Logistic Regression.

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