Registration No.: | | | | | | | | | | |

Total Number of Pages: 02 **Course: B.Tech/IDD**
Sub_Code: RCS5D002

6th Semester Regular/Back Examination: 2024-25
SUBJECT: Artificial Intelligence and Machine Learning
BRANCH(S): AEIE, AUTO, C&EE, CIVIL, ECE, EEE, EIE, ELECTRICAL, ENV, ETC, MECH, EE, ME
Time: 3 Hours
Max Marks: 100
Q.Code: S028

Answer Question No.1 (Part-I) which is compulsory, any eight from Part-II and any two from Part-III.
The figures in the right hand margin indicate marks.

Part-I

Q1 **Answer the following questions:** **(2 x 10)**

a) What is the function of an expert system shell?
b) What does "searching with partial information" mean?
c) Write the formula used in A* search.
d) State the purpose of evaluation functions in games.
e) Mention one difference between propositional and first-order logic.
f) What does it mean when two events are conditionally independent?
g) List two advantages of using Bayesian Networks.
h) Write Bayes' Rule in mathematical form.
i) Mention one difference between induction and deduction.
j) Define analogy-based learning.

Part-II

Q2 **Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve)** **(6 x 8)**

a) How does an agent interact with its environment? Discuss with a block diagram.
b) Compare and contrast uninformed search strategies: BFS vs. Uniform Cost Search.
c) Explain unification with an example. Why is it important in First-Order Logic?
d) Describe how evaluation functions are designed in adversarial search.
e) Discuss the importance and steps involved in knowledge engineering in First-Order Logic.
f) What is the significance of independence and conditional independence in probabilistic reasoning?
g) Explain how a full joint probability distribution is used for inference. Provide a small table-based example.
h) Describe the concept of acting under uncertainty with an AI agent example.
i) Differentiate between rote learning and learning by taking advice.

j) What is formal learning theory? Mention its significance in AI.

k) Describe the working of depth-limited search and iterative deepening search.

l) What is learning with hidden variables? Illustrate with a use case.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four) **(16 x 2)**

Q3 Explain the concept and implementation of means-end analysis in problem solving. How is it different from state-space search? **(16)**

Q4 Discuss the role of evaluation functions in games. How do they help in making decisions when search depth is limited? **(16)**

Q5 Describe the structure, semantics, and construction of a Bayesian Network. Explain how it captures probabilistic relationships between variables. **(16)**

Q6 Describe the working of genetic algorithms in machine learning. Include the concepts of selection, crossover, and mutation with an example. **(16)**