Reg. No. | | | | | | | | |

G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.

UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2025.

(For those admitted in June 2023 and later)

PROGRAMME AND BRANCH: B.C.A.

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
V	PART - III	CORE ELECTIVE-2	U23CA5E2A	ARTIFICIAL INTELLIGENCE

Date & Session:11.11.2025/FN **Time : 3 hours** **Maximum: 75 Marks**

Course Outcome	Bloom's K-level	Q. No.	**SECTION – A (10 X 1 = 10 Marks)** **Answer ALL Questions.**
CO1	K1	1.	Who is the inventor of Artificial Intelligence? a) Geoffrey Hinton b) Andrew Ng c) John McCarthy d) Jürgen Schmidhuber
CO1	K2	2.	Which of the following is not the commonly used programming language for Artificial Intelligence? a) Perl b) java c) prolog d)LISP
CO2	K1	3.	In heuristic search, what does the heuristic function h(n) represent? a) The exact cost from start to goal b) The number of steps taken so far c) An estimate of the cost from node n to the goal d) The total cost of the path
CO2	K2	4.	Which of the following search strategies uses a stack data structure? a) Breadth-First Search (BFS) b) Depth first search c) A* d) Best-First Search
CO3	K1	5.	In a Bayesian Network, each node represents: a) A constant value b) A variable with a fixed probability c) A random variable d) A deterministic outcome
CO3	K2	6.	What type of model is a Hidden Markov Model (HMM)? a) A deterministic model b) A neural network c) A temporal probabilistic model d) A rule based system
CO4	K1	7.	What is the main objective of MDP? a) To find the shortest path b) To maximize cumulative rewards or utility over time c) To minimize the number of states d) To eliminate uncertainty completely
CO4	K2	8.	Which of the following best describes policy iteration? a) It randomly selects policies and tests them b) It computes the optimal policy in one step c) It alternates between policy evaluation and policy improvement d) It only evaluates a fixed policy without changing it

CO5	K1	9.	What is the main goal of adaptive dynamic programming (ADP) in reinforcement learning? a) To eliminate all exploration b) To learn a transition model and reward function to compute utilities c) To directly maximize Q-values without a model d) To ignore future rewards
CO5	K2	10.	What does the Q in Q-learning stand for? a) Quality b) Quantity c) Query d) Quantum
Course Outcome	**Bloom's K-level**	**Q. No.**	**SECTION – B (5 X 5 = 25 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	11a.	Recall the concept of intelligent agents and its environment with suitable examples. **(OR)**
CO1	K3	11b.	Explain the role of AI in a real-world scenario and describe its application and impact.
CO2	K3	12a.	Differentiate Depth-First Search (DFS) and Breadth-First Search (BFS) with a suitable example. **(OR)**
CO2	K3	12b.	Implement Random Search on a given function to find an approximate optimum and analyze its strengths and weaknesses.
CO3	K4	13a.	Comment on Bayes' rule and it use with an example **(OR)**
CO3	K4	13b.	Discuss the structure and working of Hidden Markov Models (HMMs) with an example
CO4	K4	14a.	Illustrate the concept of a utility function and how it is used in decision-making under uncertainty? **(OR)**
CO4	K4	14b.	Break down the value iteration algorithm used in MDPs and examine how each step impacts the convergence toward the optimal value function
CO5	K5	15a.	Compare Q-learning and temporal difference learning in the context of active reinforcement learning. **(OR)**
CO5	K5	15b.	Analyze the process of active reinforcement learning with a focus on direct utility estimation.

Course Outcome	**Bloom's K-level**	**Q. No.**	**SECTION – C (5 X 8 = 40 Marks)** **Answer ALL Questions choosing either (a) or (b)**
CO1	K3	16a.	Analyze the historical evolution of Artificial Intelligence and explain how AI has progressed from symbolic reasoning to machine learning-based models. **(OR)**
CO1	K3	16b.	Formulate a problem-solving approach in real world problem in Artificial Intelligence.

CO2	K4	17a.	Explain the A* search algorithm in detail with example problem. **(OR)**
CO2	K4	17b.	Evaluate the effectiveness of the Minimax algorithm and Alpha-Beta pruning in Game Tree Search**.**
CO3	K4	18a.	Describe the structure of a Bayesian Network and explain how it is used to represent joint probability distributions. **(OR)**
CO3	K4	18b.	Analyze the process of inference in temporal models used in probabilistic reasoning.
CO4	K5	19a.	Evaluate the effectiveness of value iteration and policy iteration algorithms in solving Markov Decision Processes. **(OR)**
CO4	K5	19b.	Critically evaluate the role of utility theory and utility function in rational decision-making under uncertainty.
CO5	K5	20a.	Examine the differences between direct utility estimation and adaptive dynamic programming in passive reinforcement learning. **(OR)**
CO5	K5	20b.	Evaluate the effectiveness of passive reinforcement learning in real-world learning environments. How does it compare to other reinforcement learning methods in terms of efficiency and adaptability?