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**22CAP316N**

# PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

## MCA DEGREE EXAMINATION MAY 2025
(Third Semester)

Branch- **COMPUTER APPLICATIONS**

## ARTIFICIAL INTELLIGENCE

Time: Three Hours  Maximum: 75 Marks

### SECTION-A (10 Marks)
Answer **ALL** questions

**ALL** questions carry **EQUAL** marks  (10 × 1 = 10)

| Module No. | Question No. | Question | K Level | CO |
|---|---|---|---|---|
| 1 | 1 | Which of the following best describes the nature of environments in AI?<br>a) Static and dynamic environments<br>b) Deterministic and stochastic environments<br>c) Discrete and continuous environments<br>d) All of the above | K1 | CO1 |
| | 2 | Which problem-solving technique begins with an initial state and attempts to reach a goal state through a sequence of actions?<br>a) Uninformed Search  b) Problem-solving Agent<br>c) Genetic Algorithm  d) Neural Networks | K2 | CO1 |
| 2 | 3 | Which of the following is an advantage of using alpha-beta pruning in game algorithms?<br>a) Increases the depth of the search tree<br>b) Reduces the time complexity<br>c) Always finds the shortest path<br>d) Guarantees perfect play | K1 | CO2 |
| | 4 | In a Wumpus world scenario, knowledge-based agents use which type of logic to make decisions?<br>a) Predicate Logic  b) Temporal Logic<br>c) Propositional Logic  d) Description Logic | K2 | CO2 |
| 3 | 5 | Which form of learning involves the agent making decisions based on feedback from the environment?<br>a) Supervised Learning  b) Unsupervised Learning<br>c) Reinforcement Learning  d) Semi-supervised Learning | K1 | CO3 |
| | 6 | In the context of decision trees, which criterion is commonly used to decide the best split at a node?<br>a) Mean Squared Error  b) Gini Index<br>c) Gradient Descent  d) Backpropagation | K2 | CO3 |
| 4 | 7 | Which of the following is an application of information retrieval in natural language processing?<br>a) Speech Recognition  b) Querying a search engine<br>c) Image Classification  d) Syntactic Parsing | K1 | CO4 |
| | 8 | Which technology is used in automatic translation of one language into another?<br>a) Machine Learning  b) Machine Translation<br>c) Information Extraction  d) Speech Synthesis | K2 | CO4 |
| 5 | 9 | Which of the following is considered a core challenge in robotics perception?<br>a) Object recognition in dynamic environments<br>b) Power supply management<br>c) Path optimization for static environments  d) Data storage | K1 | CO5 |
| | 10 | Which aspect of robotics involves generating a sequence of valid configurations that move the robot from its initial position to a goal position?<br>a) Localization  b) Motion Planning<br>c) Sensor Fusion  d) Reinforcement Learning | K2 | CO5 |

**Cont...**

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## SECTION - B (35 Marks)

Answer **ALL** questions

**ALL** questions carry **EQUAL** Marks (5 × 7 = 35)

| Module No. | Question No. | Question | K Level | CO |
|---|---|---|---|---|
| 1 | 11.a. | Develop the types of agents in AI. How do simple reflex agents differ from model-based agents? | K3 | CO1 |
| | | (OR) | | |
| | 11.b. | Compare breadth-first search and depth-limited search. When is each more suitable? | | |
| 2 | 12.a. | Dissect stochastic games. How are they different from deterministic games? | K4 | CO2 |
| | | (OR) | | |
| | 12.b. | Categorize, how does a logical agent work in a knowledge-based system? | | |
| 3 | 13.a. | Appraise the process of training an artificial neural network using backpropagation. | K5 | CO3 |
| | | (OR) | | |
| | 13.b. | Distinguish the differences between reinforcement learning and supervised learning. | | |
| 4 | 14.a. | Measure the role of machine translation in natural language processing. | K5 | CO4 |
| | | (OR) | | |
| | 14.b. | Explain how speech recognition systems work. | | |
| 5 | 15.a. | Discuss the challenges of robot perception and how sensors are used to gather information about the environment. | K6 | CO5 |
| | | (OR) | | |
| | 15.b. | Elaborate the techniques are used to handle uncertainty in real-world robotic systems. | | |

## SECTION -C (30 Marks)

Answer **ANY THREE** questions

**ALL** questions carry **EQUAL** Marks (3 × 10 = 30)

| Module No. | Question No. | Question | K Level | CO |
|---|---|---|---|---|
| 1 | 16 | Apply the process of problem formulation in AI. How does a problem-solving agent use this process to achieve a goal? | K3 | CO1 |
| 2 | 17 | Compare and contrast first-order logic and propositional logic in the context of knowledge representation. | K4 | CO2 |
| 3 | 18 | Estimate the key features and limitations of supervised learning. Provide examples of algorithms used in supervised learning. | K5 | CO3 |
| 4 | 19 | Evaluate the process of information extraction in natural language processing. | K5 | CO4 |
| 5 | 20 | Elucidate a case study on robotic perception systems used in autonomous vehicles. | K6 | CO5 |

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