

B.Tech III Year I Semester (R20) Regular &amp; Supplementary Examinations January 2024

**ARTIFICIAL INTELLIGENCE**

(Common to CE, EEE, ME, ECE and FT)

Time: 3 hours

Max. Marks: 70

**PART – A**  
(Compulsory Question)

\*\*\*\*\*

1 Answer the following: (10 X 02 = 20 Marks)

- |  |    |
|--|----|
| (a) What is Artificial Intelligence?                           | 2M |
| (b) What are the properties of task environment?               | 2M |
| (c) Differentiate Informed & Uninformed search. Give examples. | 2M |
| (d) Define A* search.  | 2M |
| (e) Define reinforcement learning.                             | 2M |
| (f) Explain N-gram model.                                      | 2M |
| (g) Explain data sparsity.                                     | 2M |
| (h) Define the rendering model with an example.                | 2M |
| (i) List out the today's robots primary categories.            | 2M |
| (j) What are the ethical implications of intelligent machines? | 2M |

**PART – B**

(Answer all the questions: 05 X 10 = 50 Marks)

- |   |  |     |
|---|--|-----|
| 2 | Define in your own words: (i) intelligence, (ii) logical reasoning, (iii) agent, (iv) rationality. | 10M |
|---|--|-----|

**OR**

- |   |  |    |
|---|--|----|
| 3 | (a) Explain the simplex reflex agents and model-based reflex agents.               | 5M |
|   | (b) Write pseudo code agent programs for the goal-based and utility-based agents.  | 5M |
| 4 | (a) Explain breadth first search uniform search strategy.                          | 5M |
|   | (b) What is heuristic search algorithm? Write the Heuristics for 8-puzzle problem? | 5M |

**OR**

- |   |   |    |
|---|---|----|
| 5 | (a) Explain about online search agents and unknown environment.     | 5M |
|   | (b) Explain why problem formulation must follow goal formulation.   | 5M |
| 6 | (a) Explain direct utility estimation with example.                 | 5M |
|   | (b) Explain widrow-hoff rule or delta rule for online least square. | 5M |

**OR**

- |   |  |    |
|---|--|----|
| 7 | (a) Is reinforcement learning an appropriate abstract model for evolution? What connection exists, if any, between hardwired reward signals and evolutionary fitness?  | 5M |
|   | (b) Write a program to do segmentation of words without spaces. Given a string, such as URL "thelongestlistofthelongeststuffatthelongestdomainnameatlonglast.com", return a list of component words: ["the", "longest", "list", ....]. | 5M |

**Contd. in Page 2**

- 8 (a) Write a context free grammar for the palindrome language: the set of all strings whose second half is the reverse of the first half. 5M
- (b) Using DCG notation , write a grammar for a language that is just like  $\epsilon_1$  , except that it enforces agreement between the subject and verb of a sentence and thus does not generate ungrammatical sentences such as "I smells the wumpus". 5M

**OR**

- 9 (a) In the shadow of a tree with a dense, leafy canopy, one sees a number of light spots. Surprisingly, they all appear to be circular. Why? After all, the gaps between the leaves through which the sun shines are not likely to be circular. 5M
- (b) How do we detect edges in a image? Explain with an example? 5M
- 10 (a) List out the different classes of sensors. Explain any two in detail. 5M
- (b) Describe the localization and mapping. 5M

**OR**

- 11 (a) Find and analyze an account in the popular media of one or more of the arguments to the effect that AI is impossible. 5M
- (b) Explain functionalism and the brain replacement experiment. 5M

\*\*\*\*\*

B.Tech III Year I Semester (R20) Regular &amp; Supplementary Examinations January 2024

**ARTIFICIAL INTELLIGENCE**

(CSE (Cyber Security))

Time: 3 hours

Max. Marks: 70

**PART – A**  
(Compulsory Question)

\*\*\*\*\*

1 Answer the following: (10 X 02 = 20 Marks)

- |   |    |
|---|----|
| (a) Define AI. List its any two applications. | 2M |
| (b) Define percept sequence of an agent.      | 2M |
| (c) Explain the term heuristic function.      | 2M |
| (d) What is meant by search agents?           | 2M |
| (e) What are the applications of RL?          | 2M |
| (f) Define Text Classification.               | 2M |
| (g) Define ambiguity State its types.         | 2M |
| (h) What is semantic grammar?                 | 2M |
| (i) What is cell decomposition?               | 2M |
| (j) Define Agent Components.                  | 2M |

**PART – B**

(Answer all the questions: 05 X 10 = 50 Marks)

- |   |    |
|---|----|
| 2 (a) What is AI? Discuss about Foundations and history of AI.        | 5M |
| (b) Explain in detail, the structure of different intelligent agents. | 5M |

**OR**

- |   |    |
|---|----|
| 3 (a) What is an agent? Explain the basic kinds of agent program. | 5M |
| (b) Explain in detail, the Nature of Environments.                | 5M |

- |   |    |
|---|----|
| 4 (a) Define a problem and its components. Explain how a problem solving agent works? | 5M |
| (b) Explain in detail with examples:  | 5M |
| (i) Recursive Best First Search(RBFS).  |    |
| (ii) Heuristic Functions.   |    |

**OR**

- |   |    |
|---|----|
| 5 (a) What is A* search? Explain various stages of A* search with an example. | 5M |
| (b) Discuss about online search agents and unknown environments.              | 5M |

- |   |    |
|---|----|
| 6 (a) Differentiate between Passive Reinforcement and Active Reinforcement Learning | 5M |
| (b) Explain supervised learning, reinforcement learning, and unsupervised learning. | 5M |

**OR**

- |   |    |
|---|----|
| 7 (a) Explain the steps involved in natural language processing.            | 5M |
| (b) Describe about Text Classification and Information Retrieval in detail. | 5M |

- |  |    |
|--|----|
| 8 (a) Explain the different Techniques of Object recognition in restricted contents. | 5M |
| (b) What is phase structure grammar? Give its limitations.                           | 5M |

**OR**

- |  |    |
|--|----|
| 9 (a) Enlist and explain different Components of Natural Language Understanding process. | 5M |
| (b) Define Machine Translation. Explain about different types of Machine Translation.    | 5M |

**Contd. in Page 2**

**Code: 20A05502T**

- 10 (a) Discuss Different applications of robotics. 5M  
(b) Explain the concept of planning with state space search with an example . 5M

**OR**

- 11 (a) Explain about: 5M  
(i) WeakAI vs Strong AI.  
(ii) Ethics and Risks of AI.  
(b) What are effectors? Describe its use in Robot Design. 5M

\*\*\*\*\*