National Institute of Technology Mizoram

Mid – Semester Examination, Even Semester - 2022

Artificial Intelligence (CSL 1604)

B.Tech 6th Semester(CSE) **Full Marks: 15 marks** **Duration: 1:00 hour**

ANSWER ALL QUESTIONS

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1. Specify a global database, rules, and a termination condition for a production system to solve the following water-jug problem:

Given a 5-liter jug filled with water and an empty 2-liter jug, how can one obtain precisely 1 liter in the 2-liter jug? Water may either be discarded or poured from one jug into another. However, no more than the initial 5 liters is available.

Also, show the solution path obtained through breadth-first search. [5]

2. a) Show that the 8-puzzle states are divided into two disjoint sets, such that no state in one set can be transformed into a state in the other set by any number of moves.

b) Compare and contrast depth-first search, breadth-first search, and iterative deepening search.

[3 + 2]

3. Write a general graph-searching procedure and explain it. [5]

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Mid–Semester Examination, Even Semester – (2022-2023)

Artificial Intelligence (CSL 1604)

B.Tech 6th Semester **Full Marks: 30** **Duration: 1:30 hours**

All questions are Compulsory. All Questions Carry the Same Marks
(3 × 10 = 30 Marks)

1. (a) Explain engineering application and definition of Artificial Intelligence with real life example. [2]
   (b) Classify the AI Problem based on assumption (only name, example and keyword for Definition for each problem). [2]
   (c) Make a class to implement agent and its function. [1]
   (d) Find a solution of 8-Queen problem. [2]
   (e) What is the difference between Uninformed and Informed Search? [1]
   (f) Write a brief description about LRP with real life example. [2]

2. (a) Write a difference between action and feasible action with example. [1.5]
   (b) Explain the completeness, optimality, time complexity and memory complexity for: (i) Breath First Search, (ii) Uniform Cost Search, (iii) Limited Depth First Search, (iv) Bi-Directional Search. [2]
   (c) Discuss the optimality property with power to ensure that A^* algorithm is optimal or not. [1.5]
   (d) Read the below statement and identify the Problem-Type for (i), and (ii): [1]
   "You are running a company, and you want to develop learning algorithm to address to address two problems: (i) You have a large inventory of identical items. You want to predict how many of these items will sell over the next three months. (ii) You had to like software to examine individual customer accounts, and for each account decide if it has been hacked or compromised."
   (e) Explain Cocktail Party Problem and its solution. [2]
   (f) How do a presence of social interactions affect the motion of motion of pedestrian and vehicle. [2]

3. (a) Write a name of the algorithms that solve the all-pair shortest path and single source shortest path problems. [1]
   (b) What do you mean by Transformer Networks? Also give example for the same. [2]
   (c) Write a program to create video clip for the Numerical Python based visualization. [2]
   (d) Make an input/output-based machine to find a $2^{'s}$ complement of a given binary number [2]
   (e) What do you understand by "TrajNet++"? Also give example for the same. [2]
   (f) What was the benchmarking for 'TrajNet++'? [1]

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End–Semester Examination, Even Semester – (2022-2023)

Artificial Intelligence (CSL 1604)

B.Tech 6th Semester **Full Marks: 50** **Duration: 2:30 hours**

All questions are Compulsory. All Questions Carry the Same Marks
(5 × 10 = 50 Marks)

1. (a) State the difference between parameters, features, target variables, input variables with example. [4]

   (b) Discuss the significance of matrices for developing Advanced AI model with example. [6]

2. (a) What is feature scaling? [2]

   (b) Explain probabilistic framework model in detail. [8]

3. (a) What is adversarial search and its strategy? Give the game example and its solution for the same. [4]

   (b) Explain $\alpha\beta$ pruning and theorem proving with example. [6]

4. (a) What is NLP and its real-life application with example? [4]

   (b) Write important consideration about knowledge-based agent and preposition logic with example. [6]

5. (a) Write research objective of Advanced AI based project. [6]

   (b) State the real-life application of AI in the various field such as E-commerce, E-tourism, Industry, and Medicine. Also include real-life examples for the same. [4]