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Fifth Semester B.E. Degree Examination, Dec.2023/Jan.2024
Principles of Artificial Intelligence

Time: 3 hrs.   Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What are the most important components of an AI program? List and explain. **(05 Marks)**
   b. List any 5 sub areas of AI and explain the relevance of the same. **(05 Marks)**
   c. List any 5 real time application of AI and explain how the listed fields are benefitted. **(05 Marks)**
   d. AI is interdisciplinary, hence foundations of AI are traced out in various fields like mathematics, Neuroscience, Control theory and Linguistics. Choose any 2 from the given list and elaborate on the relationship between these fields and AI. **(05 Marks)**

OR

2 a. Write all the production rules that is required for water jug problem along with description for each and every rule and atleast one solution path. **(10 Marks)**
   b. State and explain Eight puzzle problem in detail. **(10 Marks)**

Module-2

3 a. Elaborate on the procedure of Alpha-Beta pruning. **(10 Marks)**
   b. Explain how to generate a same tree using MINMAX procedure. **(10 Marks)**

OR

4 a. Differentiate between game problem and state space problem. **(08 Marks)**
   b. Write a same tree for NIM game with MAX playing first. Explain the same in detail. **(12 Marks)**

Module-3

5 a. Explain the concept of prepositional calculus logic with an example of your choice. **(10 Marks)**
   b. List and explain all the rules of Natural deduction system. **(10 Marks)**

OR

6 a. List and explain all the rules of semantic tableau system. **(10 Marks)**
   b. (i) State the results of resolution process.
      (ii) Apply the resolution refutation principle and prove that CVD is a logical consequence of $s = \{A \vee B, \sim A \vee D, CV \sim B\}$ **(10 Marks)**

Module-4

7 a. Explain Block world problem in detail using an example of your own. **(10 Marks)**
   b. What is logic based planning? Elaborate on the solution steps for solving the problem based on the logic learnt. **(10 Marks)**

OR

8 a. Explain Means-Ends Analysis (MEA) problem solving technique in detail. **(10 Marks)**
   b. Write a note on linear planning using a goal stack. **(10 Marks)**

Module-5

9 a. Is it possible to represent knowledge using semantic network? Justify your answer with proper statements and tree representation if required. **(10 Marks)**
   b. Elaborate on the concept of implementing inheritance in semantic Net. **(10 Marks)**

OR

10 a. Write a note on :
   (i)   Forward reasoning inference.
   (ii) Backward reasoning inference. **(10 Marks)**
   b. List and explain the various phases involved in building expert system. **(10 Marks)**

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