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Paper Code : MCAN-302 Artificial Intelligence
UPID : 003880

Time Allotted : 3 Hours   *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following :   [1 x 10 = 10]

   (I)   An algorithm that gives optimal solution is
      i) Hill Climbing
      ii) BFS
      III) Blind Search
      iv) A*

   (II)   A formula is valid if
      i) it is a tautology.
      ii) it is inconsistent.
      iii) there exists one consistent model.
      iv) None of the above

   (III)   Feed-forward neural networks are one of the simpler types of neural networks. It conveys information in one direction through input nodes T

   (IV)   An example of forward chaining would be making predictions about the movement of the stock market. T

   (V)   What is Artificial Intelligence?
      i) Putting your intelligence into computer
      ii) Programming with your own intelligence
      iii) Making a machine more intelligent
      iv) Putting more memory into computer.

   (VI)   Which one is blind search?
      i) DFS
      ii) Best Fit Search
      iii) Best First Search
      iv) AO* Search.

   (VII)   Which is not a property of representation of knowledge?
      i) Representational verification
      ii) Representational adequacy
      iii) Inferential adequacy
      iv) Inferential efficiency.

   (VIII)   Neural networks are in fact multi-layer _____.

   (IX)   Inference engine has two strategies _____ and _____.

   (X)   "John is very tall" —This statement can be completely represented in
      i) FOPL
      ii) propositional logic
      iii) fuzzy logic
      iv) default logic

   (XI)   A heuristic is a way of
      i) to discover something or an idea embedded in a program.
      ii) to search and measure how far a node in a search tree seems to be from a goal.
      iii) to compare two nodes in a search tree to see if one is better than the other.
      iv) Only i and ii
      v) Only i, ii and iii

   (XII)   Components of knowledge base are _____ and _____.

Group-B (Short Answer Type Question)
Answer *any three* of the following :   [5 x 3 = 15]

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2. Prove the admissibility and completeness of A*. [5]

3. Differentiate between Inferential Knowledge and Inheritable Knowledge. [5]

4. What are the different forms of learning? Discuss the explanation based learning. [5]

5. Explain Travelling Salesman Problem. [5]

6. What is frame and slot? Compare inheritable knowledge and inferential knowledge. [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following : [15 x 3 = 45]

7. (a) Prove that if a heuristic follows the monotone restriction, then it will be admissible. [5]

   (b) Explain the requirements of control strategies employed in heuristic search techniques in state space problem solving. [5]

   (c) What is monotonic and non monotonic reasoning? [5]

8. (a) Write a prolog program to find the sum of first N natural numbers. [5]

   (b) What is MYCIN? [5]

   (c) What is inductive learning? [5]

9. Formulate a set of operators with their precondition, delete and add lists for manipulating blocks on the table using one arm of a robot. [15]

10. (a) What is script? [5]

    (b) What are the components of the script? [5]

    (c) Write the script for the bank robbery and watching a movie. [5]

11. (a) What do you mean by a rational agent? [5]

    (b) Give a comparative study between different informed searches with respect to space and time complexity. [5]

    (c) Write short notes on Natural Language Processing. [5]

*** END OF PAPER ***