Sl. No.

BE2-R4 : ARTIFICIAL INTELLIGENCE AND NEURAL NETWORKS

NOTE :
1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours   Total Marks: 100

1. (a) Explain briefly the Min-Max search process by taking an example. Write a pseudo-code procedure for minimax evaluation of a game tree.

(b) Define term: Artificial Intelligence (AI). List and explain various AI task domains in brief.

(c) Explain Generate and Test Heuristic Search technique. Write an algorithm of it.

(d) Explain Non monotonic Reasoning Systems with example.

(e) Discuss game tree in artificial intelligence. Why game tree is called an AND OR tree? Write an example of it.

(f) Elaborate on knowledge based system. Enlist the difficulties in knowledge based system development.

(g) Explain Bayes' theorem. Write equations of Baye's rule.   **(7x4)**

2. (a) What is calculated in back propagation algorithm for any network? Explain Back propagation learning algorithm of Artificial Neural Network and draw a diagram of process of back propagation algorithm.

(b) Unification is an algorithmic process of solving equations between symbolic expressions. Justify the statement with an example.   **(9+9)**

3. (a) Decomposable to smaller problems: it is one characteristic that is often used to classify the problem in Artificial Intelligence (AI). Enlist the other problem characteristics in AI?

(b) AO* algorithm are used for representing the solution. Write down the steps of AO* algorithm as a heuristic search technique.   **(9+9)**

4. (a) Represent the following facts in predicate logic :

    (i) Marcus was a man

    (ii) Marcus was a Pompeian

    (iii) All Pompeians were Romans

    (iv) Caesar was a ruler

    (v) All Romans were either loyal to Caesar or hated him

    (vi) Everyone is loyal to someone

   (b) What is learning? Explain Hebb's rule and Delta Rule of Learning with example.

   (c) Define natural language processing. Enlist the steps of natural language processing. **(6+6+6)**

5. (a) Branch-and-Bound is a way to combine the space saving of depth-first search with heuristic information. Write a short note on Branch and Bound.

   (b) Breadth First Search (BFS) visits the node level by level whereas Depth First Search (DFS) visit nodes of graph depth wise. This is one of the differences between the two. Mention other differences between Breadth First Search and Depth First Search. **(9+9)**

6. (a) What is Hopfield neural network in artificial intelligence? Explain it with the diagram.

   (b) What is knowledge representation? Explain in detail about the various approaches of knowledge representation in AI. **(9+9)**

7. (a) Explain various layers in Artificial Neural Network (ANN). Also describe significance of Hidden layer. How to select number of neurons in each layer of Artificial Neural Network (ANN) ?

   (b) Enlist the various types of learning. Differentiate between Supervised and Unsupervised Learning. **(9+9)**

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