

BE2-R4: ARTIFICIAL INTELLIGENCE & 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) Give an example of problems for which BFS would work better than DFS. Explain it in detail.
 - b) Characterize the terms: Neuron, Learning, Bias, and Perceptron.
 - c) Explain Horn Clauses and execution strategy of PROLOG program.
 - d) What do you mean by search space and problem (state) space? How to search a problem space? Briefly mention the application domain where Artificial Neural Network can be used.
 - e) Differentiate: Unsupervised Learning and Supervised Learning.
 - f) Why back-propagation is required in Neural Network training?
 - g) Elaborate in brief: Hebb's rule and Delta rule.

(7x4)

2.
 - a) Draw the architecture of Multilayer Perceptrons. Briefly mention the execution steps of Neural Network Learning.
 - b) How recurrent network is different from the feed forward network? Discuss briefly.
 - c) What are the problems with processing of English Language? What are the phases (steps) of NLP?

(6+6+6)

3.
 - a) Distinguish between *state space search* and *constraint satisfaction* technique. What are the termination conditions for *constraint satisfaction* technique? Trace the execution of the constraint satisfaction procedure in solving the crypt arithmetic problem:
CROSS + ROADS = DANGER.
 - b) Give the first-order logic representation of these sentences. Use a consistent alphabet.
 - i) Not all students take both history and biology.
 - ii) No person likes a smart vegetarian.
 - iii) There is a woman who likes all men who are not vegetarians.
 - iv) The best score in history was better than the best score in biology.
 - v) Every person who dislikes all vegetarians is smart.
 - vi) There is a barber who shaves all men in town who do not shave themselves.
 - vii) No person likes a professor unless the professor is smart.
 - viii) Only one student failed both history and biology.
 - ix) Politicians can fool some of the people all the time, and they can fool all of the people some of the time, but they can't fool all of the people all of the time

(9+9)

4.
 - a) What is Knowledge? Explain types of Knowledge representation techniques in brief. Compare **Procedural** v/s **Declarative knowledge**.
 - b) Production system and control strategies are two approaches of problem solving. What do you mean by a production system? What does a production system consists of? Discuss the important characteristics of production system and control strategy.

(9+9)

5.

- a) Write steps AO* algorithm, how it is differ from A* Algorithm.
- b) Which are various Task domain of AI? List various application of AI, in brief with advantage of AI techniques.
- c) Write a PROLOG program to find factorial of given number.

(6+6+6)

6.

- a) Diffentiate Fuzzy logic and Crisp logic, Fuzzy logic and Probability.
- b) Justify the use of *fuzzy logic* in AI. What are the criticisms for *fuzzy logic*?
- c) Explain Dempster Shafer theory

(6+6+6)

7.

- a) Explain *Cut*, *Recursion* and *Negation* in brief. Give suitable example from *PROLOG*.
- b) What do you mean by *local maximum*? Does Hill-Climbing technique suffer from local maximum? Give solution, if any, for solving the problem.
- c) Explain Back propagation Training of Artificial Neural Network.

(6+6+6)