

2022

COMPUTER SCIENCE — HONOURS

Paper : DSE-B-3

(Introduction to Computational Intelligence)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer question no. 1 and any four questions from the rest.

2×5

1. Answer any five questions :

(a) State the significance of Hopfield network.

(b) Define rough set.

(c) How do semantic networks work?

(d) Briefly discuss about De-fuzzification.

(e) Distinguish between supervised and semi-supervised learning.

(f) What do you mean by probability measures of fuzzy events?

(g) How are weights updated in back-propagation?

(h) Distinguish between data driven and goal driven search.

2. (a) Discuss with an example about the Breadth First Search algorithm with respect to AI. (3+4)+3

(b) Discuss about the time complexity of Breadth First Search.

3. (a) What do you mean by Game playing?

(b) Discuss about Minimax algorithm. 2+5+3

(c) Why are game playing problem considered as AI problems?

4. (a) What do you mean by fuzzy set and crisp set? Give an example for each set.

(b) Prove that $(\tilde{A} \cup \tilde{B}) = \tilde{A}^C \cap \tilde{B}^C$, where \tilde{A} and \tilde{B} are fuzzy sets.

$$\tilde{A} = \{(x_1, 0.6), (x_2, 0.4)\}$$

$$\tilde{B} = \{(x_1, 0.2), (x_2, 0.3)\}.$$

$\{(2+2)+(1+1)\}+4$

Please Turn Over

5. \tilde{A} and \tilde{B} are two fuzzy sets. It is given that $\mu_{\tilde{A}}(x) = \frac{1}{x+1}$ and $\mu_{\tilde{B}}(x) = \frac{x}{x+1}$.

Find membership function of each of the following :

2×5

(a) $\tilde{A} \cup \tilde{B}$

(b) $\tilde{A} \cap \tilde{B}$

(c) \tilde{A}^C and \tilde{B}^C

(d) $(\tilde{A} \cup \tilde{B})^C$

(e) $(\tilde{A} \cap \tilde{B})^C$

6. (a) What do you mean by artificial neural network? Give an example.

(b) Compare artificial neural network with biological neural network.

(c) Store (1, 1, 1, 0) in a Hopfield net and describe the form of weighted matrix.

(2+1)+3+4

7. (a) Discuss iterative deepening search with an example.

(b) Discuss about the time complexity of iterative deepening search algorithm.

(4+3)+3

8. Write short notes on (any two) :

(a) Single layer perceptron model

(b) Fuzzy Relation

(c) State Space Search

(d) Bayesian network.

5×2