2021

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** from the rest.

1. Answer **any five** questions : 2×5
   - (a) What do you understand by state space search?
   - (b) Differentiate data driven search and goal driven search.
   - (c) Define fuzzy set.
   - (d) Discuss any two characteristics of Prolog.
   - (e) What is Heuristic function?
   - (f) What do you mean by Semantic Net?
   - (g) Distinguish between Machine learning and Deep learning.
   - (h) Discuss in brief about fuzzy relationship.

2. (a) Discuss with an example about the Depth First Search algorithm.
   - (b) Discuss about the time complexity of Depth First Search. (4+4)+2

3. Write short notes on (**any two**) : 5×2
   - (a) Gradient Descent Method
   - (b) Feed forward neural network
   - (c) De-fuzzification
   - (d) Training dataset.

4. (a) Differentiate between probabilistic approach and fuzzy logic based approach.
   - (b) What is the sequence of steps taken in designing a fuzzy logic machine? 5+5

5. (a) What do you understand by Game playing in Artificial Intelligence?
   - (b) Explain Minimax search algorithm for game playing. 3+7

Please Turn Over

6. (a) Differentiate fuzzy set and crisp set.

   (b) Prove that $\left(\tilde{A} \cap \tilde{B}\right)^{c} = \tilde{A}^{c} \cup \tilde{B}^{c}$

   where, $\tilde{A} = \{(x_1, 0.4), (x_2, 0.3)\}$

   and $\tilde{B} = \{(x_1, 0.2), (x_2, 0.6)\}$

   and $\tilde{A}$ and $\tilde{B}$ are fuzzy set.   5+5

7. $\tilde{A}$ and $\tilde{B}$ are two fuzzy sets.

   $\mu_{\tilde{A}}(x) = \dfrac{x}{x+1}$ and $\mu_{\tilde{B}}(x) = \dfrac{1}{x}$

   Find membership function of each of the following :

   (a) $\tilde{A}^{c}$ and $\tilde{B}^{c}$

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

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

   (d) $\left(\tilde{A} \cup \tilde{B}\right)^{c}$

   (e) $\left(\tilde{A} \cap \tilde{B}\right)^{c}$ 2×5

8. (a) Discuss with an example about A^* algorithm.

   (b) Is iterative deeping search complete?— Justify your answer.   7+3

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