

CBCS SCHEME

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15EE661

Sixth Semester B.E. Degree Examination, Feb./Mar.2022 Artificial Neural Networks and Fuzzy Logic

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Compare the structural of biological and artificial neuron. (05 Marks)
b. List the characteristics of neural network. (05 Marks)
c. Explain the classification of learning methods in Neural networks. (06 Marks)

OR

- 2 a. Explain in detail the architecture of neural networks. (10 Marks)
b. Explain any three activation functions used in artificial neural network. (06 Marks)

Module-2

- 3 a. Explain the architecture of a back propagation network. (10 Marks)
b. List the tuning parameters and its effect on back propagation neural network. (06 Marks)

OR

- 4 a. Discuss in detail, the training algorithm used in back propagation network. (10 Marks)
b. State the application of back propagation algorithm. (06 Marks)

Module-3

- 5 a. Explain how the following data are stored in a auto correlator and retrieved from it:
 $A_1 = (-1, 1, -1, 1)$
 $A_2 = (1, 1, 1, -1)$
 $A_3 = (-1, -1, -1, 1)$
Which data is retrieved when $A' = (1, 1, 1, 1)$ is presented. (10 Marks)
b. Write a short note on Bidirectional Associative Memory (BAM). (06 Marks)

OR

- 6 a. Discuss in detail the training algorithm used in ART1 network. (10 Marks)
b. Briefly describe the architecture of ART2 network. (06 Marks)

Module-4

- 7 a. Distinguish between Crisp and Fuzzy logic. (06 Marks)
b. Given three Crisp sets A, B and C, prove DeMorgan's laws using Venn diagrams. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

OR

- 8 a. Consider the fuzzy sets \tilde{A} and \tilde{B} defined on the interval $X = [0, 5]$ of real numbers by the membership grade function $\mu_A(x) = \frac{x}{x+1}$, $\mu_B(x) = 2^{-x}$.
- Determine the mathematical formulae and graphs of the membership functions of each of the following sets :
- A^c, B^c
 - $A \cup B$
 - $A \cap B$
 - $(A \cup B)^c$
- (10 Marks)
- b. Given $\tilde{A} = \{(x_1, 0.4)(x_2, 0.8)(x_3, 0.6)\}$, $\tilde{B} = \{(x_1, 0.2)(x_2, 0.6)(x_3, 0.9)\}$. Find $\tilde{A} \oplus \tilde{B}$.
- (06 Marks)

Module-5

- 9 a. Verify the following :
- $\sim(P \vee Q) = (\sim P \wedge \sim Q)$
 - $\sim(P \wedge Q) = (\sim P \vee \sim Q)$
- (10 Marks)
- b. Explain the following with respect to propositional logic:
- Modus Ponens.
 - Modus Tollens.
 - Chain rule.
- (06 Marks)
- 10 a. Define Defuzzification and explain three methods defuzzification. (10 Marks)
- b. Define and explain interval type-2 fuzzy sets. (06 Marks)
