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**BRAINWARE UNIVERSITY**

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Brainware University
398, Ramkrishnapur Road, Barasat
Kolkata, West Bengal-700125

Term End Examination 2025-2026
Programme – M.Tech.(CSE)-2025
Course Name – Computational Intelligence
Course Code - MTS20406
(Semester II)

Full Marks : 60**Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question)

1 x 15=15

1. Choose the correct alternative from the following :

- (i) Identify the main pitfall of traditional Artificial Intelligence.
 - a) Imprecision
 - b) Speed
 - c) Cost
 - d) Memory
- (ii) Prepare the layer in a Multi-Layer Perceptron that is not directly visible.
 - a) Input Layer
 - b) Output Layer
 - c) Hidden Layer
 - d) Static Layer
- (iii) Choose the activation function commonly used to introduce non-linearity.
 - a) Sigmoid
 - b) Linear
 - c) Constant
 - d) Static
- (iv) Prepare the term for the strength of a connection in a neural network.
 - a) Bias
 - b) Weight
 - c) Node
 - d) Layer
- (v) Identify the membership range of a Fuzzy Set.
 - a) 0 or 1
 - b) [0 to 1]
 - c) Integers
 - d) Strings
- (vi) Inspect the purpose of an activation function.
 - a) Linearity
 - b) Non-linearity
 - c) Sorting
 - d) Storage
- (vii) Choose the layer that extracts spatial features in images.
 - a) Pooling
 - b) Dropout
 - c) Convolutional
 - d) Fully connected
- (viii) Identify the goal of an Optimization Model.
 - a) Finding best solution
 - b) Sorting data
 - c) Data storage
 - d) Printing
- (ix) Choose the term for one full pass through the training data.

- a) Batch
- b) Epoch
- c) Iteration
- d) Step
- (x) Choose the network suitable for image recognition.
 - a) RNN
 - b) CNN
 - c) GAN
 - d) BAM
- (xi) Prepare the term that is used for creating virtual instances of resources.
 - a) Clustering
 - b) Virtualization
 - c) Scaling
 - d) Pooling
- (xii) Identify the goal of Cluster Computing.
 - a) Single tasking
 - b) Parallel processing
 - c) Data entry
 - d) Storage only
- (xiii) Prepare the model that is used to data flows forward only.
 - a) RNN
 - b) Feedforward
 - c) BAM
 - d) Hopfield
- (xiv) Choose the term for a fuzzy set with a single member having membership 1.
 - a) Fuzzy Singleton
 - b) Crisp Set
 - c) Empty Set
 - d) Universal Set
- (xv) Identify the main characteristic of a Hopfield Network.
 - a) Feedback loops
 - b) Feedforward
 - c) No layers
 - d) Linear only

Group-B

(Short Answer Type Questions)

3 x 5=15

- 2. Describe the core idea behind Backpropagation Learning. (3)
- 3. Explain the cause that a single-layer perceptron cannot solve the XOR problem. (3)
- 4. Describe the architecture of a Feedforward Neural Network. (3)
- 5. List three types of Membership Functions used in Fuzzy Logic. (3)
- 6. Summarize the process of Supervised Learning. (3)

OR

Distinguish between Crisp Sets and Fuzzy Sets. (3)

Group-C

(Long Answer Type Questions)

5 x 6=30

- 7. Summarize the purpose of the activation function in a perceptron. (5)
- 8. Summarize the standard fuzzy operations: Union and Intersection. (5)
- 9. Analyze the Vanishing Gradient problem in deep neural architectures. (5)
- 10. Evaluate the choice of Sigmoid vs ReLU in hidden layers. (5)
- 11. Evaluate the Centroid method of defuzzification against the Max-Membership method. (5)
- 12. Design a case study for CI in Stock Prediction. (5)

OR

Design an Elitism strategy for a Genetic Algorithm. (5)

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