K. K. Wagh Institute of Engineering Education & Research, Nashik

(An Autonomous Institute From A.Y. 2022-23)

WINTER-2025	
Exam Seat No.:	
Academic Year:2025-2026	Semester:VI
Class:TY	Program:B.Tech
Branch Code:ETC	Pattern:2022
Name of Course:Neural Network and Fuzzy Control	Course Code:ETC223014(D)
Max. Marks:60	Duration:2.30 Hrs.

Instructions: Candidates should read carefully the instructions printed on the Question Paper and on the cover page of the Answer Book, which is provided for their use.

1. This question paper contains __02___page(s).
2. Answer to each new question is to be started on a new page.
3. Assume suitable data wherever required, but justify it.
4. Draw the neat labelled diagrams, wherever necessary.
5. The last columns indicates the Course Outcome and level of Blooms Taxonomy of the Question/sub-question.

		Marks	CO
Question No. 1			
1a)	Explain the role of fuzzy systems in artificial intelligence and machine learning.	(6)	CO 1
Question No. 2			
2a)	Describe the McCulloch-Pitts neuron model along with its architecture and working principle.	(6)	CO 2
Question No. 3			
3a)	Explain the architecture, working principle, and applications of Hopfield Networks	(8)	CO 2
	OR		
3b)	Explain the architecture of a standard backpropagation neural network.	(8)	CO 2
3c)	What are the key differences between batch gradient descent and stochastic gradient descent in backpropagation?	(8)	CO 2
	OR		
3d)	What are the common activation functions used in backpropagation networks, and how do they impact learning?	(8)	CO 2
Question No. 4			
4a)	What are the key applications of Kohonen self-organizing maps	(8)	CO 3
	OR		
4b)	Explain the learning vector quantization (LVQ) algorithm.	(8)	CO 3
4c)	Explain the basic architecture and operation of Adaptive Resonance Theory (ART).	(8)	CO 3
	OR		
4d)	Discuss the advantages and limitations of competitive learning networks in neural computing.	(8)	CO 3
Question No. 5			

5a)	Describe the architecture of a Cognitron. What are its main components and how are they interconnected?	(8)	CO 4

OR

5b)	Explain the concept of "feature extraction" in the context of Cognitrons and Neocognitrons. How do these networks learn to extract relevant features from input patterns?	(8)	CO 4
5c)	What are Fuzzy Associative Memories (FAMs)? How do they differ from traditional associative memories?	(8)	CO 4

OR

5d)	Explain the concept of defuzzification. Describe two common defuzzification methods.	(8)	CO 4

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