SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
M.Tech I Year I Semester Regular Examinations January-2026
AI TECHNIQUES IN ELECTRICAL ENGINEERING
(Power Electronics)

Time: 3 Hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

UNIT-I

1	a	Define Artificial Neural Networks (ANN) and explain their basic structure.	CO1	L2	6M
	b	Describe any two common models of neural networks with examples.	CO1	L2	6M

OR

2	a	Distinguish between single-layer and multi-layer neural network architectures.	CO1	L2	6M
	b	What is knowledge representation in neural networks? Give examples.	CO1	L2	6M

UNIT-II

3	a	Explain the architecture of a multi-layer perceptron (MLP)	CO2	L2	6M
	b	Describe how information flows during forward propagation.	CO2	L2	6M

OR

4		Explain the Backpropagation algorithm and show how weights are updated with a numerical example.	CO2	L2	12M

UNIT-III

5	a	What is the need for fuzzy logic in real-world applications?	CO3	L1	6M
	b	Compare fuzzy logic and classical (crisp) logic in terms of uncertainty handling.	CO3	L3	6M

OR

6	a	Define crisp sets and fuzzy sets with examples. How do they differ?	CO3	L2	6M
	b	Explain the role of membership functions in fuzzy sets.	CO3	L2	6M

UNIT-IV

7	a	Explain the basic working principles of Genetic Algorithms.	CO4	L2	6M
	b	Describe how Genetic Algorithms mimic natural evolution for solving optimization problems.	CO4	L2	6M

OR

8	a	Explain binary encoding in Genetic Algorithms with a suitable example.	CO5	L2	6M
	b	Describe floating-point encoding with an example.	CO5	L2	6M

UNIT-V

9	a	Define load forecasting and list the major types of forecasting used in power systems.	CO5	L1	6M
	b	Explain how AI-based methods (ANN, Fuzzy, GA) improve the accuracy of short-term load forecasting.	CO5	L2	6M

OR

10	a	Describe the role of Artificial Intelligence in power system load flow studies.	CO5	L2	6M
	b	Apply fuzzy logic to explain how uncertainty in load demand can be handled in economic load dispatch.	CO5	L3	6M

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