BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

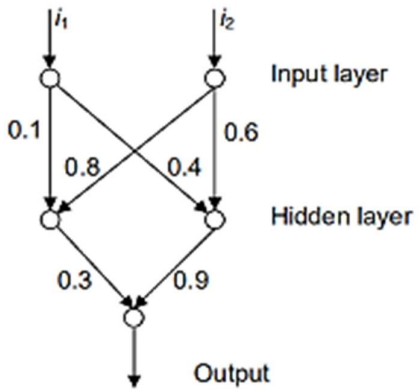
CLASS: B.Tech **SEMESTER : VI**
BRANCH: EEE **SESSION : SP/2025**

SUBJECT: EE519 COMPUTATIONAL TECHNIQUES IN ELECTRICAL ENGINEERING

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Explain the steps involved in solving an optimization problem using Genetic Algorithm.	[5]	2	2
Q.1(b)	Solve the differential equation, with initial condition $y(0)=1$, using Runge-Kutta 4th order method. Take step size h=0.1and find $y(0.1)$. $\frac{dy}{dx} = y + x^2$	[5]	2	3
Q.2(a)	Design a fuzzy logic controller for temperature control in an industrial system. Mention inputs, outputs, and membership functions.	[5]	5	6
Q.2(b)	Explain the application of neural networks in fault detection in power systems.	[5]	4	2
Q.3(a)	Compare artificial neural networks with human brain structure. Highlight similarities and differences.	[5]	3	2
Q.3(b)	For the neural network shown below, perform a single iteration of back-propagation with learning rate 0.2, input [1, 0], and target output 0. Use sigmoid activation function.	[5]	3	3



Q.4(a)	A fuzzy set for Speed is given as: Speed = {(slow, 0.9), (medium, 0.6), (fast, 0.2)} and Distance = {(short, 0.1), (moderate, 0.7), (long, 1.0)}. Construct the fuzzy relation *R* between speed and distance using the min-max method.	[5]	5	3
Q.4(b)	A fuzzy set is defined using a triangular membership function with vertices at (2, 0), (5, 1), and (8, 0). (i) Draw the fuzzy set (ii) Find the centroid (center of gravity) defuzzified value.	[5]	5	4
Q.5(a)	Explain the concept of economic load dispatch (ELD). Explain its importance in power system operation, and what are the challenges involved when considering transmission losses?	[5]	2	2
Q.5(b)	Discuss the working of neuro-fuzzy systems and their advantages in real-time electrical system modeling.	[5]	4	2

:::::30/04/2025 M:::::