

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION MAY- 2025

M.Tech-II Semester (ECE)

COURSE CODE (CREDITS): 22M11CI211(3)

MAX. MARKS: 35

COURSE NAME: SOFT COMPUTING

COURSE INSTRUCTORS: Er.MUNISH SOOD

MAX. TIME: 2 Hours

Note: (a) All questions are compulsory.

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	Consider an Adaptive resonance theory type 1 (ART-1) net with 5 input units and 3 cluster units. After some training the net attains the bottom-up $B_{3 \times 5}$ and top-down $T_{3 \times 5}$ weight matrices as shown below. Show the behavior of the net if it is presented with the training pattern $s = [0, 1, 1, 1, 1]$. Assume learning rate $L=2$ and vigilance parameter $\rho=0.8$. $B_{5 \times 3} = \begin{bmatrix} 0.2 & 0 & 0.2 \\ 0.5 & 0.8 & 0.2 \\ 0.5 & 0.5 & 0.2 \\ 0.5 & 0.8 & 0.2 \\ 0.1 & 0 & 0.2 \end{bmatrix} \quad T_{3 \times 5} = \begin{bmatrix} 1 & 1 & 0 & 1 & 1 \\ 0 & 1 & 1 & 1 & 0 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix}$	4	5
Q2	Construct a kohonen self organizing map to cluster 4 given vectors $[0 \ 0 \ 1 \ 1], [1 \ 0 \ 1 \ 0], [0 \ 1 \ 1 \ 1], [0 \ 0 \ 0 \ 1]$. Number of cluster to be formed are 2, assume initial learning rate of 0.5	3	5
Q3	Implement OR gate using Widrow Hoff Delta learning rule for artificial neural networks.	3	5
Q4	Write short notes on a) Genetic Algorithm b) Convolutional Neural Network c) Adaptive Resonance Theory d) Recurrent neural networks e) Credit Assignment Problem	4	10
Q5	Maximize the function $f(x) = x^2$ where x varies from 0 to 31, using Genetic Algorithm. Choose initial population size $n=4$.	3	5
Q6	Implement XOR gate using Multilayer perceptron.	2	5