Government College of Engineering, Aurangabad

(An Autonomous Institute of Government of Maharashtra)

F.Y. MCA (CBCS) Examination May-2023

MC1116: Soft Computing

***Time*: 1.0 Hours** **Date : 05-06-2023** **Max. Marks: 20**

Q. 1	**Attempt any two from the following**	**Marks**
A	What is neural network? Compare biological neurons with ANN.	5
B	Implement XOR function using McClloch-Pitts neurons (Consider binary data)	5
C	State and explain various activation functions available in Artificial Neural Network.	5
Q. 2	**Attempt any two from the following**	**Marks**
A	What is Artificial Neural Network? With neat sketch, explain different terms used in ANN with characteristics.	5
B	Implement AND-NOT function using McClloch-Pitts neurons (Consider binary data)	5
C	Explain various learning techniques used in Artificial Neural Network.	5

Government College of Engineering, Aurangabad

(An Autonomous Institute of Government of Maharashtra)

FYMCA Second Semester [2 Years MCA] Examination (CBCS)

End Semester Examination July 2023

Time: 3: 0 Hours — ***MC1116: Soft Computing*** — *Max. Marks: 60*

20 JUL 2023

"Verify the course code and check whether you have got the correct question paper"

1. *Assume suitable data if necessary and state it clearly*
2. *Use of non-programmable calculator is allowed*
3. *Attempt all questions in sequence*

Q. No.	Questions	Course Outcomes (Cos)	Bloom's Taxonomy Levels (BTLs)	Marks
Q1.	**Attempt the following**			
	a) What is Artificial Intelligence? State the typical AI problems. Explain approaches, advantages and limitations of AI.	01	K2	06
	b) State and explain various models used in Artificial Neural Network.	01	K2	06
Q2.	**Attempt any two from the following**			
	a) What is Artificial Neural Network? With neat sketch, explain the different terms used in ANN with characteristics.	02	K2	06
	b) What is Soft Computing? State the characteristics of Soft Computing. What are the applications of Soft Computing?	02	K2	06
	c) What is linear separable problem? How it is solved using logic gates? Give the Examples of few gates with sample data.	02	K3	06
Q3.	**Attempt any two from the following**			
	a) Use Adeline network to train ANDNOT function with bipolar inputs and targets. Perform 2 epochs of training.	02	K3	06
	b) Draw neat flowchart for Radial Basis Function Network (RBF).	03	K2	06
	c) Obtain the output of the neuron using binary and bipolar sigmoidal function: [x1,x2,x3]=[0.5,0.7,0.3], [w1,w2,w3]=[0.4,0.7,-0.4], bias is b=0.45	03	K3	06

Q4.	**Attempt the following**			
	a) Explain a Mexican hat networks? Draw the flowchart for Mexican Hat Neural Network.	04	K2	06
	b) Consider a Kohonen self-organizing net with two cluster units and five input units. The weight vectors for the cluster units are given by w1 = [1.0 0.9 0.7 0.5 0.3] w2 = [0.3 0.5 0.7 0.9 1.0]. Use the square of the Euclidean distance to find the winning cluster unit for the input pattern x = [0.0 0.5 1.0 0.5 0.0], using the learning rate of 0.25, find the new weights for the winning unit.	04	K3	06
Q5.	**Attempt any two from the following**			
	a) What is fuzzy logic? Explain the classical sets or Crisp sets associated with it.	05	K2	06
	b) Using the inference approach, obtain the membership values for the triangular shapes (*L, R, T*) for a triangle with angles 40°, 60° and 80°.	05	K3	06
	c) Given the two fuzzy sets $B_1 = \left\{\frac{1}{1.0} + \frac{0.75}{1.5} + \frac{0.3}{2.0} + \frac{0.15}{2.5} + \frac{0}{3.0}\right\}$ $B_2 = \left\{\frac{1}{1.0} + \frac{0.6}{1.5} + \frac{0.2}{2.0} + \frac{0.1}{2.5} + \frac{0}{3.0}\right\}$ find the following: (a) $B_1 \cup B_2$: (b) $B_1 \cap B_2$: (c) $\overline{B_1}$: (d) $\overline{B_2}$: (e) $B_1 \mid B_2$: (f) $\overline{B_1 \cup B_2}$:	05	K3	06