B.E. Electronics & Communication/Telecommunication Engineering (Model Curriculum)
Semester-VIII

ET805M-1 - Introduction of Neural Network and Artificial Intelligence

P. Pages : 2

Time : Three Hours

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Max. Marks : 80

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Notes : 1. All questions carry marks as indicated.
2. Due credit will be given to neatness and adequate dimensions.
3. Assume suitable data wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) State and verify following properties of fuzzy sets through an example. **8**
  i) Law of Contradiction
  ii) Associativity
  iii) Idempotency
  iv) Involution

  b) How fuzzy sets are represented mathematically? Illustrate with an example. **8**

OR

2. a) Distinguish between crisp logic and fuzzy logic. **8**

  b) List out the different industrial applications of fuzzy logic based system. Discuss any one application in detail. **8**

3. a) Define the complements of fuzzy set with respect to two axioms. Also discuss Sugeno's and Yager's class of complement. **8**

  b) Find Sugeno's class of complement of fuzzy set A given below for the values of **8**

$$\lambda = \{-0.8, 0, 1, 2\}$$

$$A = \frac{0.7}{1} + \frac{0.5}{2} + \frac{0.1}{3} + \frac{0.6}{4}$$

OR

4. a) Fuzzy sets A and B with the universe of discourse $x \in N$ as given below. **8**

$$A = \frac{0.3}{2} + \frac{0.6}{2} + \frac{1.0}{6}$$

$$B = \frac{0.5}{1} + \frac{1.0}{2} + \frac{0.5}{4}$$

Find the Division of fuzzy numbers A and B.

  b) Find the intersection of Fuzzy sets A and B for the universe of discourse $A = \{1, 2, 3, 4\}$ using T-norm operators. **8**

$$A = \frac{0.7}{1} + \frac{0.5}{2} + \frac{0.1}{3} + \frac{0.6}{4}$$

$$B = \frac{0.8}{2} + \frac{0.3}{3}$$

5.	a)	Define linguistic variable with the help of example. Also discuss following classification of linguistic variable with an example: i) Primary terms ii) Linguistic hedges iii) Negation/complement iv) Connectives	**8**

b) If a Linguistic variable related to Rose "Red" on the universe of discourse $X = \{1, 2, 3, 4, 5\}$ is defined as- **8**

$$Red = \left\{ \frac{1.0}{1} + \frac{0.8}{2} + \frac{0.6}{3} + \frac{0.4}{4} + \frac{0.2}{5} \right\}$$

i) Not Red
ii) Very Red
iii) Not Very Red
iv) Slightly Red
v) Very Very Red

<div align="center">OR</div>

6.	a)	What are the capabilities of Neural Network? Discuss along with suitable examples.	**8**
	b)	What is Artificial Neural Network? Give its Strength and applications.	**8**
7.	a)	Illustrate the functions of Biological Neuron. Discuss how artificial neuron models are inspired from Biological Neurons.	**8**
	b)	Draw and discuss the Architecture of Feed forward neural network.	**8**

<div align="center">OR</div>

8.	a)	Draw and discuss the block diagram of densely interconnected three-layered static Neural Network.	**8**
	b)	Differentiate between Artificial and Biological Neural Network.	**8**
9.	a)	What is Machine Learning? List out it's types. Also explain any one into details.	**8**
	b)	Discuss the role of Artificial Intelligence in real life applications. Illustrate with suitable example.	**8**

<div align="center">OR</div>

10.	a)	Define Perceptron. Illustrate the basic concept of pattern classifier with neat block diagram.	**8**
	b)	Illustrate general learning rule for updating the weight parameter in ANN.	**8**

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