

**GANPAT UNIVERSITY**

**B. Tech. Semester: VII Biomedical & Inst. Engineering**  
**CBCS Regular Examination November – December - 2013**  
**2BM705 – Neural Networks & Fuzzy Logic**

**Total Marks: 70**

**Time: 3 Hours**

- Instruction:**
1. Write each section in separate answer book.
  2. Answer should be brief and to the point.
  3. Assume suitable data, if necessary.
  4. Figure to the right indicates marks.

**Section - I**

**Que. - 1**

- a) Enlist different basic problems and system analysis problems which are used for decision making by the human operator which represents the interdependencies among them. How it is used in the field of medicine for diagnostic function?
- b) What is the structure of fuzzy rule? Differentiate fuzzy rule and conventional rule by using appropriate example.

**12**

**OR**

**Que. - 1**

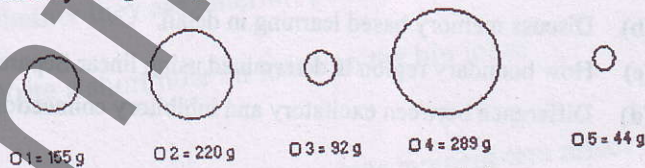
- a) Explain following inference / principle using fuzzy variables:
  - i) Entailment Inference
  - ii) Conjunctive Inference
  - iii) Extension Inference
- b) Explain the concept of Right Hand side computation in fuzzy inference engine.

**12**

**Que. - 2**

- a) Consider a fuzzy set having different sizes of orange labeled O 1 to O 5. Size is determined by weight in grams.

**11**



Draw membership curve by giving mathematical solution. Then draw the complement of it. Also, represent this concept by using classical two value logic. Make comment on it.

- b) What are the design steps of fuzzy logic?

**OR**

**Que. - 2**

- a) Define following terms:
  - i) Linguistic variable
  - ii) Support
  - iii) Core
  - iv) Cross over point
  - v) Alpha cut

**11**

- b) What is the evaluation of antecedent of fuzzy variable? Explain the evaluation for single input data point using appropriate example.

- Que. - 3 12
- a) Describe the following membership function along with their syntax. Also give their proof by mathematical expression.  
i) trapmf ii) trimf
- b) Differentiate Normal & Sub-Normal fuzzy set.

Section - II

- Que. - 4 12
- (a) Define artificial neural network with proper diagram and in what ways does ANN resemble the brain?
- (b) Explain the Hebb Net with architecture and algorithm.

OR

- Que. - 4 12
- (a) Explain the single layer perceptron with architecture and algorithm.
- (b) Realize the XOR function using McCulloch Pitts neurons using Binary input & target.

- Que. - 5 11
- (a) Explain the adaline network with proper architecture and algorithm.
- (b) What are the types of learning? Explain error correction learning in detail.

OR

- Que. - 5 11
- (a) Draw the architecture of Back Propagation Network (BPN) and explain in detail.
- (b) Develop Adaline network for ANDNOT function with bipolar inputs and targets up to 2 epochs and note down the LMS error for the whole network.

- Que. - 6 12
- Answer any three.
- (a) How is "winner takes all" process executed by competitive learning?
- (b) Discuss memory based learning in detail.
- (c) How boundary region is determined using linear Separability concept?
- (d) Difference between excitatory and inhibitory connection.

END OF PAPER