

**NTK/KW/15/7542**

**Faculty of Engineering & Technology**  
**Seventh Semester B.E. (EC/ET) (C.B.S.) Examination**  
**ELECTIVE-I: FUZZY LOGIC & NEURAL**  
**NETWORK**

Time—Three Hours]

[Maximum Marks—80

**INSTRUCTIONS TO CANDIDATES**

- (1) All questions carry marks as indicated.
- (2) Solve Question No. **1** **OR** Questions No. **2**.
- (3) Solve Question No. **3** **OR** Questions No. **4**.
- (4) Solve Question No. **5** **OR** Questions No. **6**.
- (5) Solve Question No. **7** **OR** Questions No. **8**.
- (6) Solve Question No. **9** **OR** Questions No. **10**.
- (7) Solve Question No. **11** **OR** Questions No. **12**.
- (8) Due credit will be given to neatness and adequate dimensions.
- (9) Assume suitable data wherever necessary.
- (10) Illustrate your answers wherever necessary with the help of neat sketches.

8. (A) For given classical sets  $A = \{9, 5, 6, 8, 10\}$ ;  $B = \{1, 2, 3, 7, 9\}$ ;  $C = \{1, 0\}$  defined on universe  $X$  of natural number. Prove the properties of associativity and distributivity. 4
- (B) What do you mean by uncertainty of data ? How uncertainty leads to imprecision ? 5
- (C) What is Compositivity Property ? Explain it with reference to classical set relations. 5
9. (A) Write short note on fuzzy extension principle. 4
- (B) What do you mean by fuzzy mapping ? Explain in detail. 4
- (C) Explain Lambda cut in reference with fuzzy sets and fuzzy relations. 5

**OR**

10. (A) Explain the concept of membership function with the help of diagram. Also write its features. 6
- (B) What is fuzzification and membership value assignment ? State methods of membership value assignment. 7
11. (A) What is a genetic fuzzy controller ? Design a genetic fuzzy controller and explain the same. 8
- (B) How contrast of an image can be enhanced using fuzzy logic. 5

**OR**

12. Explain the concept of system control and signal processing using fuzzy logic in detail with example. 13

1. (A) Give the performance comparison of computer and Human brain on the basis of :
  - (i) Speed
  - (ii) Processing
  - (iii) Storage
  - (iv) Fault Tolerance
  - (v) Control Mechanism
  - (vi) Size and complexity. 6
- (B) State and explain in brief different network learning rules. 7

**OR**

2. (A) What do you mean by learning and adaptation in ANN ? Also explain supervised and unsupervised learning. 6
- (B) Generate O/P of logic NAND function using McCulloch Pitt's neuron model. 4
- (C) Write short note on neural processing. 3
3. (A) What is linearly non-separable pattern classification ? Explain with example. 6
- (B) Explain generalised delta learning rule for multi-perceptron layer. Why is it required ? 8

**OR**

4. Explain feed forward recall and error back propagation with neat block diagram. Also write error back propagation training algorithm. 14

5. (A) Write down mathematical foundation of discrete type Hopfield network. 7
- (B) Explain signal processing using neural networks with the help of ECG as an example. 6

**OR**

6. (A) Explain the concept of dynamical system in detail. 5
- (B) Explain control system applications i.e. washing machine and refrigerator using neural networks. 8
7. (A) For following fuzzy sets A & B given as :

$$A = \left\{ \frac{1}{2} + \frac{0.5}{3} + \frac{0.6}{4} + \frac{0.2}{5} + \frac{0.6}{6} \right\}$$

$$B = \left\{ \frac{0.5}{2} + \frac{0.8}{3} + \frac{0.4}{4} + \frac{0.7}{5} + \frac{0.3}{6} \right\}$$

Perform union, intersection, difference and complement operations. 7

- (B) What are fuzzy sets ? Explain the operations performed on fuzzy sets using membership diagram. Also state properties of fuzzy sets. 7

**OR**