

**8458**

**B.Tech. (CSE-AI) Even Semester  
Examination, 2024**

**SOFT COMPUTING**

**Paper : AI-6031**

*Time : 3 Hours ]*

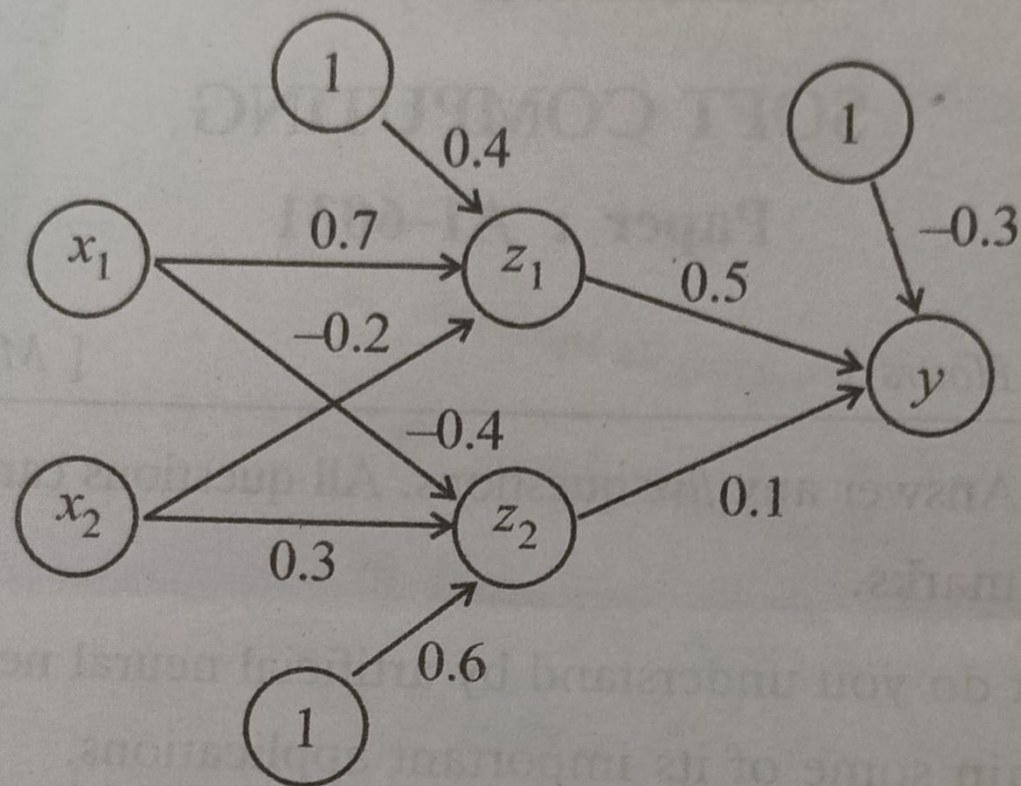
*[ M.M. : 70*

**Note :-** Answer any *five* questions. All questions carry equal marks.

1. What do you understand by artificial neural networks ?  
Explain some of its important applications.
2. Find the weights require to perform the following classification using perceptron network. The vectors  $(1, 1, 1, 1)$  and  $(-1, 1, -1, -1)$  are belong to the class (so have target value 1) and vectors  $(1, 1, 1, -1)$  and  $(1, -1, -1, 1)$  are not belonging to class (so have target value -1) assume learning rate as 1 and initial weight as '0'.



3. Find new weight when the net illustrated in given figure is presented the input pattern (0, 1) and target output is 1. Use a learning rate  $\alpha = 0.25$  and the binary sigmoid activation function.



4. (a) How is the training algorithm performed in back-propagation neural networks ?
- (b) With graphical representations, explain the activation functions used in Artificial Neural Networks.



5. Explain any two methods of composition techniques on fuzzy relations with examples.

6. Using inference approach, find the membership values for each of the triangular shapes (I, R, IR, E, T) for a triangle with angles  $120^\circ$ ,  $50^\circ$ ,  $10^\circ$ .

7. Consider universal set

$$X = \{a, b, c, d\}$$

and

$$Y = \{1, 2, 3, 4\}$$

and fuzzy sets :

$$A = \{(a, 0), (b, 0.8), (c, 0.6), (d, 1)\}$$

$$B = \{(1, 0.2), (2, 1), (3, 0.8), (4, 0)\}$$

$$C = \{(1, 0), (2, 0.4), (3, 1), (4, 0.8)\}$$

Determine the implication relations as :

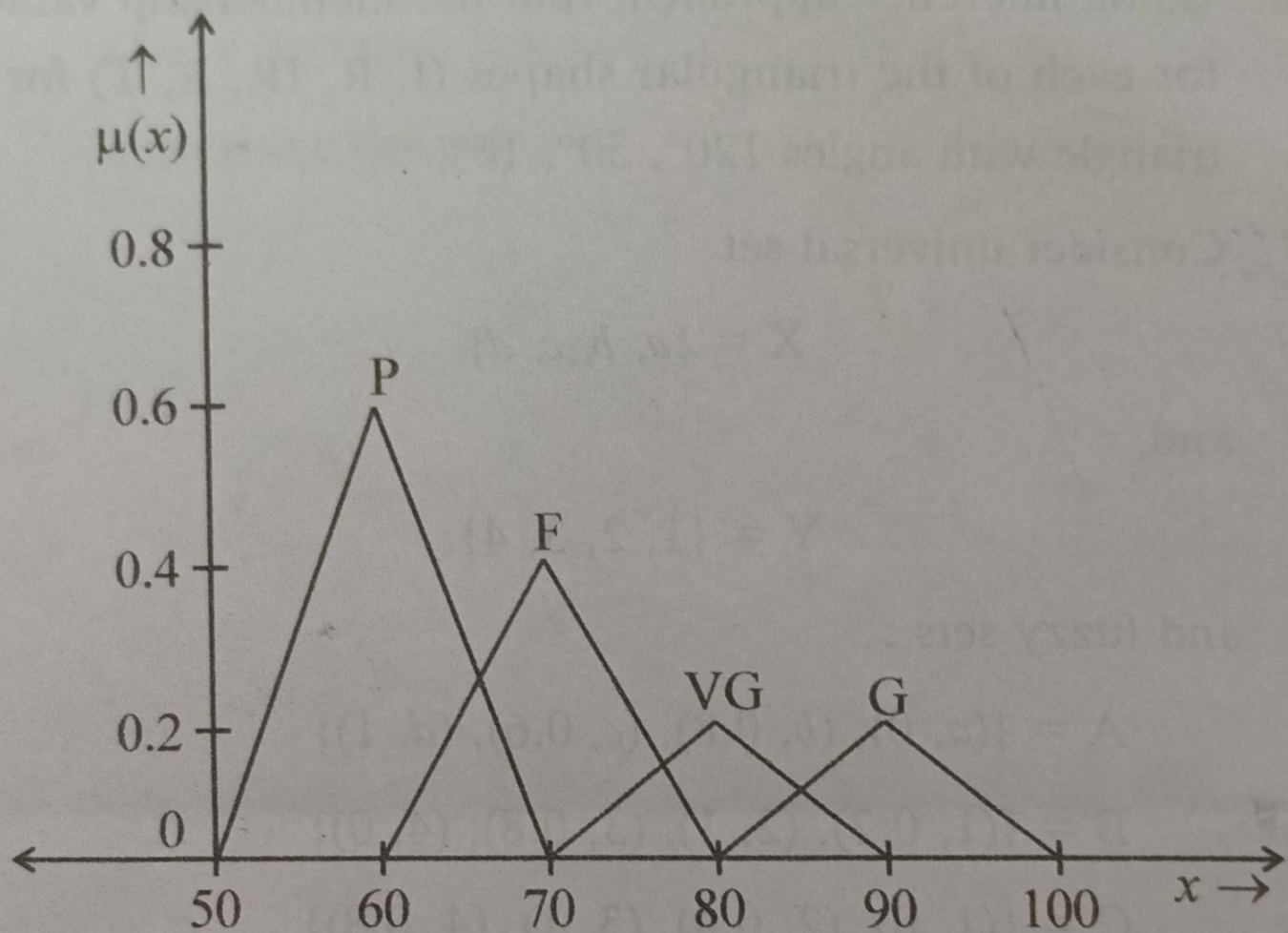
(i) If X is A then Y is B

(ii) If X is A then Y is B else Y is C.

8. Let A be a fuzzy set that tells about a student as shown in figure below. Here, the linguistic variable P represents a Pass student, F stands for a Fair student, G represents a Good student and VG represents a Very Good student.



Calculate the defuzzified value for the fuzzy set A with weighted average method and center of sum method.



9. (a) Explain stopping condition for Genetic Algorithm.
- (b) Describe 5 types of Crossover.
10. (a) Compare and contrast traditional algorithm and genetic algorithm.
- (b) Explain various types of crossover techniques.