Anekant Education Society's

Tuljaram Chaturchand College of Arts, Science and Commerce, Baramati

(Autonomous)

Department of Computer Science

Class: M.Sc.(Computer Science) – II **Semester : III**

Paper Title: Soft Computing **(pattern 2019)** **Paper Code: COMP5302**

Question Bank

Type of Question: Objective Questions

1. Which of these has been associated with fuzzy logic?
   a. Many-valued logic
   b. Crisp set logic
   c. Binary set logic
   d. Two-valued logic
   Answer: (a) Many-valued logic

2. How is the probability density function represented?
   a. Probability distributions
   b. Probability distributions for the Continuous variables
   c. Discrete variable
   d. Continuous variable
   Answer: (b) Probability distributions for the Continuous variables

3. How can uncertainty be represented?
   a. Fuzzy logic
   b. Probability
   c. Entropy
   d. All of the above
   Answer: (d) All of the above

4. The name of the operator that is present in fuzzy set theory, that is linguistic in nature, is:
   a. Hedges
   b. Lingual Variable
   c. Fuzz Variable
   d. All of the above
   Answer: (a) Hedges

5. Which of these conditions can influence a variable directly by all the others?
   a. Locally connected
   b. Partially connected
   c. Fully connected
   d. All of the above
   Answer: (c) Fully connected

6. Which of these is NOT an artificial neural network's promise?
   a. It is capable of handling noise
   b. It is capable of surviving the failure of some nodes
   c. It is capable of inherent parallelism
   d. It is capable of explaining the result
   Answer: (d) It is capable of explaining the result

7. We can use the membership function to solve empirical problems based on:
   a. Examples
   b. Experience
   c. Learning
   d. Knowledge
   Answer: (b) Experience

8. A given 4-input neuron weighs 1, 2, 3, 4. The transfer function here is linear, and the constant of proportionality is equivalent to 2. Also, the inputs here are 4, 10, 5, 20, respectively. Thus, the output would be:
   a. 119
   b. 123
   c. 238
   d. 76
   Answer: (c) 238

9. What would be the name of a network that includes backward links from a given output to its inputs along with the hidden layers?

a. Recurrent neural network
b. Multi-layered perceptron
c. Self-organising maps
d. Perceptron
Answer: (a) Recurrent neural network

10. What out of these is involved in the case of inductive learning?

a. Irregular Hypothesis
b. Estimated Hypothesis
c. Consistent Hypothesis
d. Inconsistent Hypothesis
Answer: (c) Consistent Hypothesis

11. Which of these is not counted in various learning methods?

a. Deduction
b. Introduction
c. Memorisation
d. Analogy
Answer: (b) Introduction

12. An automated vehicle refers to an application of which of these?

a. Reinforcement learning
b. Unsupervised learning
c. Active learning
d. Supervised learning
Answer: (d) Supervised learning

13. Which of these is termed to be exploratory learning?

a. Unsupervised learning
b. Reinforcement learning
c. Supervised learning
d. Active learning
Answer: (a) Unsupervised learning

14. What is the feature of ANN in which the ANN would create its own organisation for the representation of all the information that it receives during its learning time?

a. Supervised Learning
b. Self-Organisation
c. What-if Analysis
d. Adaptive Learning
Answer: (b) Self-Organisation

15. Which of these would take input in the form of an object that is described by an attribute set?

a. Decision graph
b. Graph
c. Decision tree
d. Tree
Answer: (c) Decision tree

Type of Questions: Short Question

1) Explain Multilayer Network?
2) Write down Advantages and Disadvantages of Neural network?
3) Write a note on Hebb Network?
4) Compare Brain Vs Computer?
5) Explain the Structure of Artificial Neurons?
6) Explain the role of action potential of axon?
7) Discuss the Limitations of GA?
8) State the goal of optimization?
9) What is search space in Genetic algorithm?
10) Write down DSW algorithm?

11) Explain the feature of membership function?
12) What is Fuzzification and write there different type?
13) Difference between Mamdani and Sugeno model?
14) Difference between Crisp set and Fuzzy set?
15) Difference between Fuzzification and Defuzzification?
16) Define relationship between Complexity and Uncertainty?
17) Write down Zadeh's extension principle?

Type of Questions: Short Notes

1) Uncertainty and Information.
2) Fuzzification and Defuzzification.
3) Graphical Techniques of inference.
4) Fuzzy inference process. (With diagram)
5) C-means clustering.
6) Neural network.
7) Biological Neurons.
8) Hebb Network.
9) History of Genetic algorithm.
10) Human neuron system.
11) Axon
12) Essential components of AI.

Type of Questions: Long Question

1) Write a standard forms and Boundaries (Type of fuzzy set)?
2) Define a Defuzzification .Explain different method of Defuzzification?
3) Define fuzzy propositions. Explain different propositions?
4) Write down three graphical techniques of inference with diagram?
5) Write a algorithm of hard c-means and fuzzy c-means?
6) Write two approximate methods of extension?
7) Difference between Biological neuron and artificial neurons?
8) What is the genetic algorithm? Explain the operator in GA?
9) Explain brief structure of Biological neuron?
10) Give the algorithm and flow chart of general genetic algorithm?

Type of Questions: Example

1) Let U be the universe of military aircraft of interests on define below:

U={a10,b5,b52,c130,f2,f9}

Let A be fuzzy set for bomber class aircraft.

$$A \left\{ 0.3/a10 + 0.4/b5 + 0.2/c130 + 0.1/f2 + 1/f9 \right\}$$

$$B \left\{ 0.1/a10 + 0.2/b5 + 0.8/c130 + 0.7/f2 + 0/f9 \right\}$$

Find the following.

1) $A \cup B$ 2) $A \cap B$ 3) $\overline{A}$ 4) $\overline{B}$

5) $\overline{A \cup B}$ 6) $\overline{A \cap B}$ 7) $A|B$ 8) $B|A$

2) Consider two Fuzzy sets.

A = { 0.2/x1 + 0.3/x2 + 0.4/x3 }

B = { 0.1/x1 + 0.2/x2 + 0.2/x3 }

Find 1) Algebraic sum 2) Algebraic product 3) Bounded sum 4) Bounded product

3) Suppose we define membership function for the lien linguistic variable "Heavy and Light" as follow:

Heavy = { 0.2/5 + 0.4/8 + 0.6/12 + 0.8/20 + 1/30 }

Light ={ 0/30 + 0.1/20 + 0.5/12 + 0.8/8 + 1/5}

Develop membership function for the following linguistic phrases.

1) Very Heavy 2)Not very Light

4) We have the fuzzy sets A&B each defined on it's our universe as follows.

A= { 0.2/1 + 1/2 + 0.7/4}

B={ 0.5/1 + 1/2}

Determine the membership value for the algebraic product mapping.(Zadeh's extension principal)

5) Perform the fuzzy arithmetic operation on the following interval.

1) [2,5] + [1,3]
2) [2,5] - [1,3]
3) [-1,1] * [-2,-0.5]
4) [-1,1] / [-2,-0.5]

6) Consider the following fuzzy relation R and S find Max- Min composition.

$$R=\begin{bmatrix} 0.7 & 0.5 \\ 0.8 & 0.4 \end{bmatrix}$$

$$S=\begin{bmatrix} 0.9 & 0.6 & 0.2 \\ 0.1 & 0.7 & 0.5 \end{bmatrix}$$

7) Determine the crisp ג -cut relation when ג=0.1,0,0.3 and 0.9 for the following relation R

$$R=\begin{bmatrix} 0 & 0.2 & 0.4 \\ 0.3 & 0.7 & 0.1 \\ 0.8 & 0.9 & 1.0 \end{bmatrix}$$

8) Using inference approach find the membership values for the triangular shape I,R,E,IR and T for a triangular with angle 45◦,55◦ and 80◦.

9) If someone wants to buy a cheapcar, represent a fuzzy set 'car prize' on the universe of prices and depending on the budget.

10) Consider a fuzzy number 1, the normal convex membership function define on integers.

1= {0.5/0 + 1/1 + 0.5/2}