Roll No. .....

E–1064

M. Sc. (IT) (Fourth Semester) (Main/ATKT)

EXAMINATION, May-June, 2021

(New Course)

SOFT COMPUTING

M. Sc. (IT) (402)

Time : Three Hours] [*Maximum Marks : 100*

[*Minimum Pass Marks : 40*

Note : Attempt all Sections as directed.

Section—A 1 each

(Objective/Multiple Choice Questions)

Note : Attempt all questions.

Choose the correct answer :

1. What is the form of Fuzzy logic ?
   (a) Two-valued logic
   (b) Crisp set logic
   (c) Many-valued logic
   (d) Binary set logic

2. The room temperature is hot. Here the hot (use of linguistic variable is used) can be represented by ..... .
   (a) Fuzzy set
   (b) Crisp set
   (c) Both (a) and (b)
   (d) None of the above
3. Fuzzy set theory defines fuzzy operators. Choose the fuzzy operators from the following :
   (a) AND
   (b) OR
   (c) NOT
   (d) All of the above
4. How many level of fuzzifier are there ?
   (a) 4
   (b) 5
   (c) 6
   (d) 7
5. The truth values of traditional set theory is ..... and that of fuzzy set is ..... .
   (a) either 0 or 1, between 0 and 1
   (b) between 0 and 1, either 0 or 1
   (c) between 0 and 1, between 0 and 1
   (d) either 0 or 1, either 0 or 1

6. How many main parts are there in Fuzzy Logic Systems Architecture ?
   (a) 3
   (b) 4
   (c) 5
   (d) 6

7. Each element of X is mapped to a value between 0 and 1. It is called ..... .
   (a) membership value
   (b) degree of membership
   (c) membership value
   (d) Both (a) and (b)

8. What is Fuzzy Logic ?
   (a) A method of reasoning that resembles human reasoning.
   (b) A method of question that resembles human answer.
   (c) A method of giving answer that resembles human answer.
   (d) None of the above

9. The values of the set membership are represented by ..... .
   (a) discrete set
   (b) degree of truth
   (c) probabilities
   (d) both degree of truth and probabilities

10. What are the tasks that cannot be realized or recognized by simple networks ?
    (a) Handwritten characters
    (b) Speech sequences
    (c) Image sequences
    (d) All of the mentioned

11. Fuzzy logic is usually represented as ..... .
    (a) IF-THE-ELSE rules
    (b) IF-THEN rules
    (c) Both IF-THEN-ELSE rules and IF-THEN rules
    (d) None of the mentioned

12. ..... is/are the way(s) to represent uncertainty.
    (a) Fuzzy Logic
    (b) Probability
    (c) Entropy
    (d) All of the mentioned

13. ..... are algorithms that learn from their more complex environments (hence eco) to generalize, approximate and simplify solution logic.
    (a) Fuzzy Relational DB
    (b) Ecorithms
    (c) Fuzzy Set
    (d) None of the mentioned

14. The membership functions are generally represented in :
    (a) Tabular form
    (b) Graphical form
    (c) Mathematical form
    (d) Logical form

15. Three main basic features involved in characterizing membership function are :
    (a) Intuition Inference, Rank ordering
    (b) Fuzzy algorithm, Neural network, Genetic algorithm
    (c) Core, Support, Boundary
    (d) Weighted average, Center of sums, Median

16. In a fuzzy set a prototypical element has a value :
    (a) 1
    (b) 0
    (c) infinite
    (d) not defined

17. A fuzzy set wherein no membership function has its value equal to 1 is called :
    (a) Normal fuzzy set
    (b) Sub-normal fuzzy set
    (c) Convex fuzzy set
    (d) Non-convex fuzzy set

18. The membership values of the membership function are nor strictly monotonically increasing or decreasing or strictly monotonically increasing than decreasing :
    (a) Convex fuzzy set
    (b) Non-convex fuzzy set
    (c) Normal fuzzy set
    (d) Sub-normal fuzzy set

19. What is equilibrium in neural systems ?
    (a) Deviation in present state, when small perturbations occur.
    (b) Settlement of network, when small perturbations occur.
    (c) Change in state, when small perturbations occur.
    (d) None of the mentioned

20. Learning is a :
    (a) Slow process
    (b) Fast process
    (c) Can be slow or fast in general
    (d) Can’t say

Section—B 2 each

(Very Short Answer Type Questions)

Note : Attempt all questions. Write answer in 2-3 sentences.

1. What are the learning factors of back propagation network ?
2. What are the applications of soft computing ?
3. What is a membership function of a fuzzy set ?

4. With the help of an example, state the role of bias in determining the net output of an Artificial Neural Network.
5. State the concept of delta-rule used in Adaptive Linear Neurons.
6. List the various operations that can be performed in fuzzy relations.
7. "Law of contradiction and law of excluded middle cannot be applied to fuzzy sets." Give proper justification to the statement.
8. Distinguish between the processes of tuning and learning in genetic-fuzzy rule based systems.
9. Distinguish between fuzzy and probability with example.
10. State the relevance of fuzzification. Explain its different types.

Section—C 3 each

(Short Answer Type Questions)

Note : Attempt all questions. Answer precisely using <75 words.

1. What is soft computing and how is it different from hard computing ?
2. Name *three* strengths and *three* weaknesses of fuzzy expert systems.
3. What do you understand by architecture of McCulloch Pitts Neuron ?
4. Implement the AND logic function using Perceptron network algorithm for bipolar input and target.
5. With suitable example, explain a simple genetic algorithm.
6. Describe briefly about the advanced functions available in MATLAB programming.

7. Describe commonly used commands for plotting graphs in result analysis.
8. State and explain the limitations of single layer perceptron.
9. Discuss the role of generalized delta rule in neural networks.
10. Briefly describe about neural dynamics and explain synaptic dynamics of neural network.

Section—D 6 each

(Long Answer Type Questions)

Note : Attempt any *five* questions. Answer precisely using 150 words.

1. Explain in detail about the various operators involved in genetic algorithm.
2. With a neat flow chart, explain the operation of simple genetic algorithm.
3. What is linear reparability ? Explain linear reparability for AND, OR and XOR functions. Draw responses for each case.
4. Describe various options available in the menus and toolbars in MATLAB software.
5. How the Hopfield memory model is useful for optimization problems ?
6. Explain the role of neural networks in the load forecasting problem.
7. Describe how fuzzy logic can be used in load frequency control.