INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal-500043, Hyderabad

B.Tech VII SEMESTER END EXAMINATIONS (REGULAR/SUPPLEMENTARY) - DECEMBER 2022
Regulation: R18
SOFT COMPUTING

Time: 3 Hours   (Common to CSE|IT)   Max Marks: 70

Answer FIVE Questions choosing ONE question from each module
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE – I

1. (a) List the characteristics of intelligent systems. Differentiate the intelligence system and knowledge base system to handle the imprecise problems.   [BL: Understand| CO: 1|Marks: 7]

   (b) Briefly describe about fuzzy rules and fuzzy control. Explain how generalized data can be used to compute the uncertainity with help of fuzzy logics.   [BL: Understand| CO: 1|Marks: 7]

2. (a) How knowledge can be represented? Explain the analysis of knowledge representation in intelligence system computations.   [BL: Understand| CO: 1|Marks: 7]

   (b) Classify the components of soft computing. Explain about the key aspects of soft computing techniques in complex problems.   [BL: Understand| CO: 1|Marks: 7]

MODULE – II

3. (a) What are the different activation functions used in ANN? Elucidate about biological neurons and their artificial models.   [BL: Understand| CO: 2|Marks: 7]

   (b) Write about about linear and non-linear pattern classification. Explain about delta learning rule for feedforward multilayer perceptron.   [BL: Understand| CO: 2|Marks: 7]

4. (a) Demonstrate the procedure of a single discrete perceptron in classifying a linearly separable problem with an example.   [BL: Understand| CO: 2|Marks: 7]

   (b) Outline about the pattern association, pattern classification and pattern mapping tasks of artificial neural network with suitable example.   [BL: Understand| CO: 2|Marks: 7]

MODULE – III

5. (a) Explain the Sugeno fuzzy model with help of fuzzy and non-fuzzy rules in membership function creation.   [BL: Understand| CO: 3|Marks: 7]

   (b) Choose any four fuzzy set operations. Write the typical fuzzy rule in sugeno fuzzy model to solve the problem.   [BL: Apply| CO: 3|Marks: 7]

6. (a) Determine the term membership function. Discuss how neural networks can be used in optimization of membership function.   [BL: Understand| CO: 4|Marks: 7]

(b) Given the two Fuzzy proposition with associated truth value as   [BL: Apply| CO: 4|Marks: 7]
$\widetilde{P}$: Mary is efficient, T($\widetilde{P}$)= 0.8
$\widetilde{Q}$:Ram is efficient, T($\widetilde{Q}$)=0.65
Find corresponding proposition statement and associated truth value for following statements

  (I) $\overline{\overline{\widetilde{P}}}$
 (II) $\widetilde{P} \wedge \widetilde{Q}$
(III) $\widetilde{P} \vee \widetilde{Q}$
(IV) $\widetilde{P} \Rightarrow \widetilde{Q}$

MODULE – IV

7. (a) Write the classification problem for optimizing the output rules using ANFIS model with an example.   [BL: Understand| CO: 5|Marks: 7]

(b) Construct an ANFIS that is equivalent to a two-input two-rule mamdani fuzzy model with min max composition and centroid defuzzification. Explain the function user use to approximate the centroid defuzzification.   [BL: Apply| CO: 5|Marks: 7]

8. (a) Summarize the usages of neural network operation in inference system to process the input data prediction.   [BL: Understand| CO: 5|Marks: 7]

(b) List the advantages and limitations of ANFIS. Develop the model of linear and non-linear approximation of input data analysis.   [BL: Apply| CO: 5|Marks: 7]

MODULE – V

9. (a) Relate how the soft computing is useful in printed character recognition applications?
   [BL: Understand| CO: 6|Marks: 7]

(b) What is evolutionary computing? Briefly explain about three applications of evolutionary computing with respect to image processing.   [BL: Understand| CO: 6|Marks: 7]

10. (a) Categorize any two applications where soft computing can be used and explain them with an example.   [BL: Understand| CO: 6|Marks: 7]

(b) How soft computing is used in information retrieval? Describe any three commercial software used for soft computing techniques.   [BL: Understand| CO: 6|Marks: 7]

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