GIET UNIVERSITY, GUNUPUR – 765022

Ph. D. (First Semester) Examinations, January – 2024

Introduction to Intelligent Systems

(CSE)

Time: 3 hrs   Maximum: 70 Marks

The figures in the right hand margin indicate marks.

Answer ANY FIVE Questions   (14 x 5 = 70 Marks)

		Marks
1.a.	Describe the backpropagation algorithm in the context of artificial neural networks. Explain how it is inspired by biological learning processes.	7
b.	Investigate the challenges and limitations associated with the biological foundations of artificial neural networks. Discuss issues such as overfitting, vanishing gradients, and the trade-off between biological inspiration and computational efficiency	7

2.a.   **1.** Two fuzzy sets are given as:

A = {0.4/2, 0.6/3, 0.8/4, 1/5, 0.8/6, 0.6/7, 0.4/8}

B = {0.4/2, 0.8/4, 1/5, 0.6/7}

Find the following operation on the given 2 fuzzy sets.

(i) Union (ii) Intersection (iii) Difference   **7**

b.	Discuss the importance of knowledge representation in intelligent systems. Explain different methods of knowledge representation	7
3.a.	Define genetic algorithms and explain their biological inspiration from the process of natural selection. Discuss the key components of genetic algorithms	7
b.	Discuss the challenges and issues associated with knowledge representation. Explore the limitations of representing real-world knowledge in a structured and computationally manageable form	7
4.a.	Write the script for Restaurant visit.	7
b.	What is multi-layer feed forward learning? How the computations are performed at the different layer of multi-layer neural network?	7
5.a.	Explain the principles of Bayesian reasoning in the context of uncertainty. How does Bayesian inference handle uncertain information and update beliefs based on new evidence?	7
b.	Define statistical learning and its role in machine learning. How does statistical learning leverage statistical methods to make predictions or decisions in the presence of uncertainty?	7

6.a. Investigate the role of fuzzy logic in Explainable Artificial Intelligence (XAI). How does fuzzy logic contribute to creating interpretable and transparent models? Provide examples of applications where the explain ability of fuzzy logic systems is crucial 7

b. Discuss recent trends in hybrid knowledge representation approaches. How are researchers combining symbolic and sub symbolic representations to address the limitations of each? Provide examples of hybrid knowledge representation systems and their advantages. 7

7.a. Describe with example statistical learning and induction learning. 14

8.a. Describe briefly different component of learning. 7

b. Describe Dumpster - Shafer Theory of Evidential reasoning 7

--- End of Paper ---