

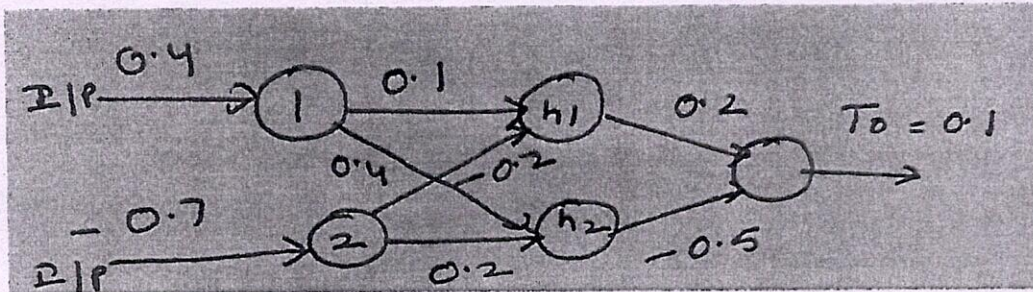
Time allowed: 3 Hours

Max. Marks: 50

NOTE: Attempt any five questions.

x-x-x

- 1 (a) Define Artificial Intelligence. How knowledge representation and reasoning methods helps in AI-for problem solving.  
(b) Discuss steps of A-star algorithm with the help of flowchart. (5,5)
- 2 (a) Discuss importance of searching techniques in AI. What are major the difference between informed and uninformed search algorithms.  
(b) (i) Explain the structure and working of a Genetic Algorithm.  
(ii) Fitness values for five individuals are:  
A = 40, B = 60, C = 10, D = 80, E=45  
Perform Roulette Wheel Selection and calculate probabilities and expected counts. (5,5)
- 3 Discuss any two defuzzification methods for decoding fuzzification. (10)
- 4 Describe the backpropagation learning algorithm. Discuss the role of learning rate and error minimization in the training process. (10)
- 5 (a) Write notes on radial basis function networks and recurrent neural networks.  
(b) A Set of temperature is defined on the universe of discourse from [0 to 80] in degree centigrade. Represent it with the suitable membership function while  
(i)  $T \leq 25$ -low  
(ii) T is between 25 to less than equal to 45 (Medium)  
(iii) T is between 45 to less than equal to 60 (Warm)  
(iv) T is greater than 60 (Hot) (5,5)
- 6 Elaborate on the application of AI techniques in load forecasting and economic load dispatch. (10)
- 7 (a) Explain predicate logic and predicate calculus. How are they used in AI reasoning?  
(b) A neural network has two inputs (0.4, -0.7) and one hidden layer with two neurons. Compute the outputs of all neurons using the sigmoid activation function.



(3,7)

- 8 (a) Describe Neuro-Genetic systems with block diagram and applications.  
(b) Verify De Morgan's laws:  
 $\neg(P \vee Q) = (\neg P \wedge \neg Q)$   
 $\neg(P \wedge Q) = (\neg P \vee \neg Q)$  (5,5)