

PART - B (12 × 2 = 24 Marks)

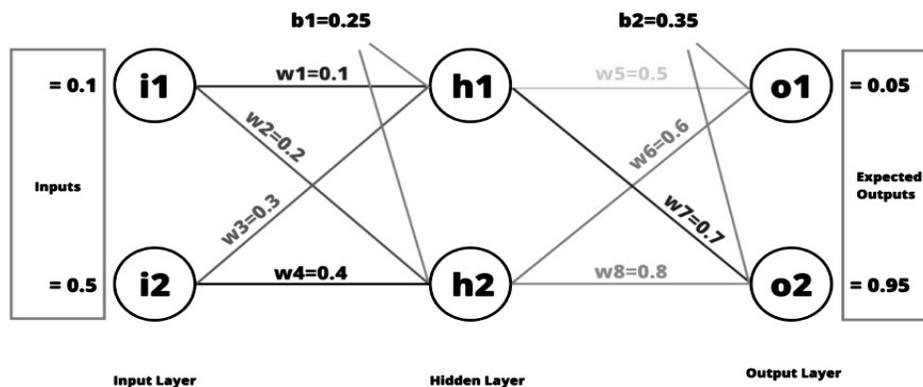
Answer ALL Questions

- | | | | |
|---|---|----|-----|
| 11. Define Natural computing. | 2 | K1 | CO1 |
| 12. Differentiate parallelism and distributivity. | 2 | K2 | CO1 |
| 13. List out the stopping criteria for hill climbing. | 2 | K1 | CO2 |
| 14. Write few applications of GA. | 2 | K1 | CO2 |
| 15. Name some of the swarm intelligence-based algorithms. | 2 | K1 | CO3 |
| 16. Explain the key characteristics of Ant Colony Optimization. | 2 | K2 | CO3 |
| 17. Outline the advantages of Particle Swarm optimization. | 2 | K2 | CO4 |
| 18. Demonstrate the formulation of Particle Swarm Optimization (PSO) Algorithm. | 2 | K2 | CO4 |
| 19. Compare biological immunology with artificial immune systems. | 2 | K2 | CO5 |
| 20. How does the Forrest's algorithm recognize a pattern? | 2 | K1 | CO5 |
| 21. Illustrate the main advantages of DNA computing. | 2 | K2 | CO6 |
| 22. Outline few operations performed for DNA computing. | 2 | K2 | CO6 |

PART - C (6 × 11 = 66 Marks)

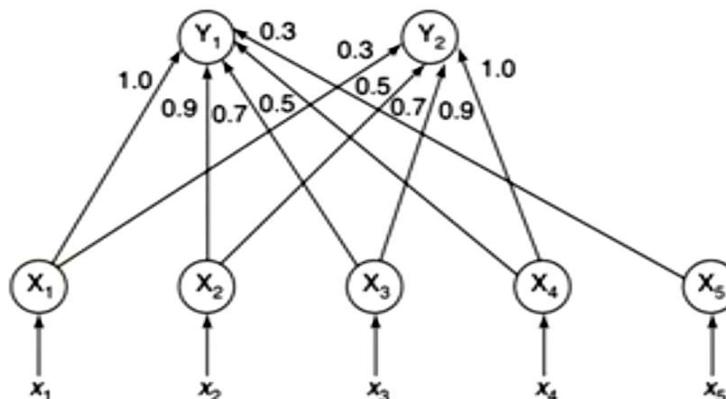
Answer ALL Questions

23. a) Perform a forward pass to compute total error and then a backward pass to distribute the error inside the network and update weights accordingly. 11 K3 CO1



OR

- b) Consider the self-organizing feature map shown below with 2 cluster and five input units, find the new weights for the winning unit for the input pattern of $x = [0.0, 0.5, 1.0, 0.5, 0.0]$. Assume the learning rate as 0.25. The input weights are given as $w_1 = [1.0, 0.9, 0.7, 0.5, 0.3]$ and $w_2 = [0.3, 0.5, 0.7, 0.9, 1.0]$. 11 K3 CO1



24. a) Organize the fitness evaluated for the given chromosomes with Roulette wheel selection process: [0001100101010, 0101001010101, 1011110100101, 1010010101001]. 11 K3 CO2
- OR**
- b) $f(x)=x^2$, maximize this function with x in interval [0,31]. Generate initial population with 01101, 11000, 01000, and 10010. 11 K3 CO2
25. a) Explain the transition rule and global pheromone in ACO. 11 K2 CO3
- OR**
- b) Compare and Contrast—Genetic Algorithm, Particle Swarm Optimization and Ant Colony Optimization. 11 K2 CO3
26. a) Discuss the applications of PSO. 11 K2 CO4
- OR**
- b) Detail exploration and exploitation with respect to the inertia term, Diversification and Intensification terms, personal and social influence. 11 K2 CO4
27. a) Explain the artificial immune systems with respect to an application of your choice. 11 K2 CO5
- OR**
- b) Describe the physiology and main components of the immune system. 11 K2 CO5
28. a) Explain in detail about formal models of DNA. 11 K2 CO6
- OR**
- b) Detail the DNA manipulation technique by Adleman’s experiment. 11 K2 CO6