

(2½ Hours)

[Total Marks: 60]

- N. B.: (1) **All** questions are **compulsory**.
 (2) Make **suitable assumptions** wherever necessary and **state the assumptions** made.
 (3) Answers to the **same question** must be **written together**.
 (4) Numbers to the **right** indicate **marks**.
 (5) Draw **neat labeled diagrams** wherever **necessary**.
 (6) Use of **Non-programmable** calculators is **allowed**.

- 1. Attempt any two of the following: 12**
- Give the comparison between feedforward and recurrent neural network.
 - State and explain the properties and applications domain of neural network.
 - Explain the different content of Neural network.
 - Solve the logical OR problem geometrical to find appropriate weights and thresholds for the neuron.
- 2. Attempt any two of the following: 12**
- Explain how Boolean function affects the linear separability.
 - Discuss the theorem that no signal threshold logic neuron can solve the logical XOR classification problem $X1 + X2$?
 - Give the derivation for back propagation algorithm.
 - In Reinforcement learning, Comment on the following:
 - how long should network be trained?
 - How many hidden layers are necessary to approximate continuous function?
- 3. Attempt any two of the following: 12**
- What is posterior probability? Derive the equation explaining posterior probability.
 - Show the interpretation of neuron signals using Bernoulli distributed data.
 - Discuss in brief about Vapnik's key theorem.
 - Give outline of the summary of k-means clustering algorithm.
- 4. Attempt any two of the following: 12**
- Explain the principal of competitive learning.
 - Discuss the associative memory model in brief.
 - Discuss in brief about competitive Hebbian learning.
 - Give the outline of the simulated annealing algorithm.
- 5. Attempt any two of the following: 12**
- Define fuzzy sets and the geometry of fuzzy sets?
Problem: If two fuzzy sets A and B are given with membership functions
 $\mu_A(x) = \{0.2, 0.4, 0.8, 0.5, 0.1\}$
 $\mu_B(x) = \{0.1, 0.3, 0.6, 0.3, 0.2\}$. Find the values of:
 $\mu(A \cap B)$ and $\mu(A \cup B)$.
 - Write a note on supervised vector quantization.
 - Discuss in brief about Fuzzy Membership functions.
 - Explain in brief about Evolutionary algorithms.
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