

# Question Paper

Exam Date & Time: 16-Jun-2023 (09:30 AM - 12:30 PM)



**MANIPAL ACADEMY OF HIGHER EDUCATION**

**INTERNATIONAL CENTRE FOR APPLIED SCIENCES  
END SEMESTER THEORY EXAMINATION-MAY 2023  
IV SEMESTER B.Sc.(APPLIED SCIENCES) IN ENGG.**

**ARTIFICIAL NEURAL NETWORK [ICS 246 - S2]**

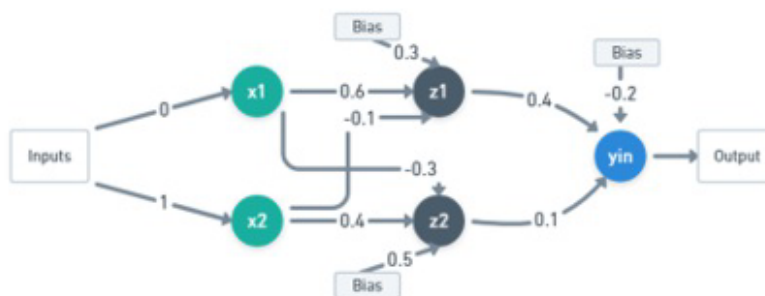
**Marks: 50**

**Duration: 180 mins.**

**Answer all the questions.**

**Missing data, if any, may be suitably assumed.**

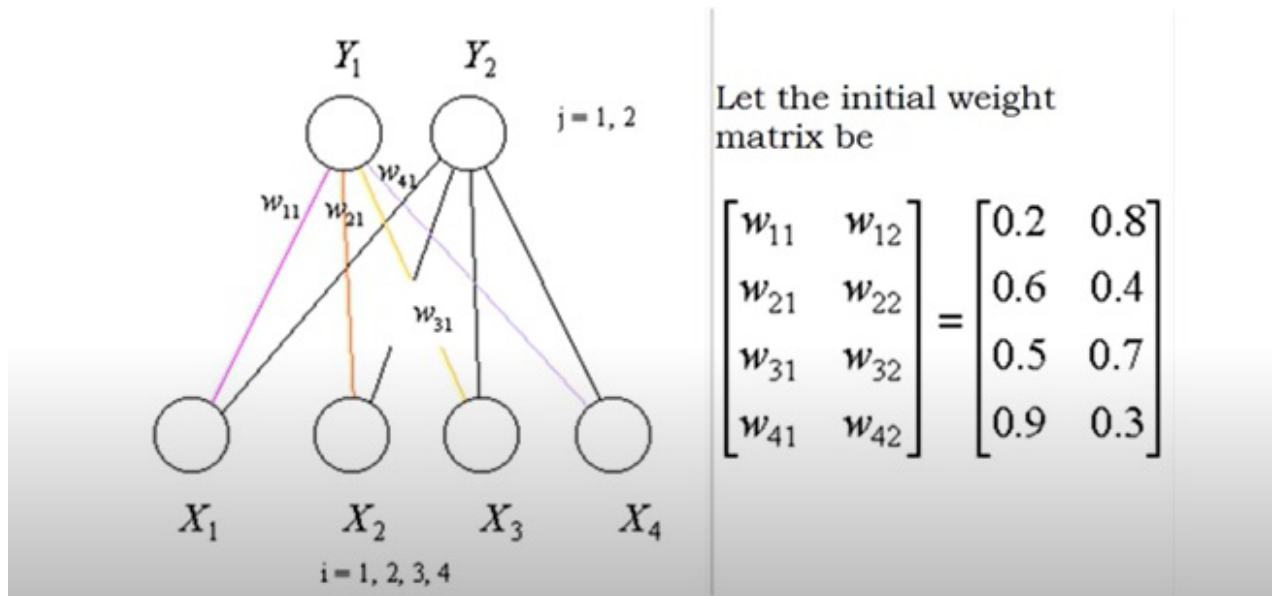
- 1) Explain various learning rules used in neural networks. (10)
- 2) Explain the recurrent neural network with the help of a diagram. (5)
  - a)
  - b) What is associative memory and its types? What is the linear associative model? (5)
- 3) Using the back-propagation algorithm, find new weights for the following network [perform one iteration]. Target value: 1, learning rate = 0.25, Activation function: Sigmoid function. (10)



- 4) What are the main similarities and differences between feed-forward neural networks and self-organising maps? (5)
  - a)
  - b) Suppose, for instance, there are two neurons in the output layer. Calculate the weight changes during the first cycle through the data, taking training vectors in the given order. The learning rate is 0.6. (5)



1	2	3	4
1	1	0	0
0	0	0	1
1	0	0	0



- 5) Compare a biological neuron and an artificial neuron. (5)
- a)
- b) Explain Why the XOR problem cannot be solved by a single-layer perceptron and how it is solved by a Multilayer Perceptron. (5)

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