

B.TECH DEGREE EXAMINATION

Eight Semester

Branch : Applied Electronics & Instrumentation

AI010 804L01- NEURAL NETWORKS

(New scheme: Regular)

Time: Three hours

Maximum: 100 Marks

Part A

Answer all questions.

Each question carries 3 marks

1. Draw the block diagram of an artificial neuron.
2. Write the output equation of a 3 input – 1 output single layer perceptron with bias.
3. A feedforward network is unconditionally stable. Explain this statement using one or two sentences?
4. Explain briefly why a competitive network has lateral connections.
5. Which are the two functional units in a Boltzmann's machine answer briefly?

(3 x 5 = 15 Marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. List the various architectures of ANNs and draw appropriate diagrams.
7. With appropriate diagram show how error information is propagated back through a MLFNN.
8. Describe briefly the difference between Autoassociative and Heterassociative memory.
9. Draw the diagram of instar network and write its weight update equation.
10. Briefly explain the principle of simulated annealing.

(5 x 5 = 25 Marks)

Part C

Answer any one full question from each module.

Each question carries 12 marks.

11. With equations describe the classical activation functions used in ANNs? (12 Marks)

Or

12. Show how a multilayered feed forward is used to solve the XOR problem. (12 Marks)

13. Derive the weight update equation for the hidden layer units using the Back Propagation algorithm. (12 Marks)

Or

14. Write short notes on

a) Steepest descent algorithm. (4 Marks)

b) Local minima and Global Minimum (4 Marks)

c) Effect of learning rate. (4 Marks)

15. Draw the diagram of fully recurrent Discrete Hopfield network with 3 output units and describe the steps involved in its training and recall. (12 Marks)

Or

16. a) How does an ART network solve the problem of stability-plasticity dilemma?

(4 Marks)

b) Draw the architecture of ART1 network and give brief descriptions about its functional modules. (8 Marks)

17. What is the principal goal of self organizing feature map network? Draw the schematic diagram of 2D-SOFM and describe the three essential process in the formation of an SOFM. (12 Marks)

Or

18. Draw the diagram of Forward only CPN and explain its working. (12 Marks)

19. Describe the operation of Boltzmann's machine. (12 Marks)

Or

20. a) Write a short note on Simulated annealing. (4 Marks)

b) Consider a 2D – plane with the vertical y - axis and horizontal x – axis. It is required to classify the plane to the two regions, C1 with output = 1 and C2 with output = 0. The decision algorithm is:

If $f(x-2) \geq 0$ output of the network =1 and

If $f(x-2) < 0$ the output of the network is 0.

Using simple matlab commands write a matlab program to implement the classification. –
(8 Marks)

(12 x 5= 60 Marks)