B.Tech. DEGREE EXAMINATION, MAY 2022
Fifth & Sixth Semester

18CSE388T – ARTIFICIAL NEURAL NETWORK
(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

Note:
(i)   **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) **Part - B** should be answered in answer booklet.

Time: 2½ Hours
Max. Marks: 75

PART – A (25 × 1 = 25 Marks)
Answer **ALL** Questions

Marks BL CO PO

1. Neural networks
   (A) Use black box approach
   (B) Learn a set of rules
   (C) Rules are interpretable by Humans
   (D) Use classic approach
   — 1 2 1 1

2. Scientists who first performed precise mathematical analysis of perception
   (A) Frank Rosenblatt and Charless Wightman
   (B) Warren McCulloch and Walter Pitts
   (C) Bernard Widrow And Marcian Hoff
   (D) Marvin minsky and Seymour Papert
   — 1 1 1 1

3. Peripheral nervous system
   (A) Brain and spinal cord
   (B) Controls inner processes of body
   (C) Coordinates motor functions
   (D) Sends commands to organs
   — 1 1 1 1

4. Receptor cells
   (A) Motor coordination
   (B) Part of brain
   (C) Perform sensory transduction
   (D) Send signals to muscle
   — 1 1 1 1

5. Stimulus only increases logarithmically with intensity of signal
   (A) Skin
   (B) Ears
   (C) Eyes
   (D) Nose

6. Output function of Neuron
   (A) Transforms net input to activation
   (B) Transform outputs of other neurons to net input
   (C) Often identity function
   (D) Often constant function
   — 1 2 1 1

7. Near _____, the activation function of a neuron is particularly sensitive
   (A) Zero value
   (B) Threshold value
   (C) Minimum value
   (D) Maximum value
   — 1 2 1 1

8. Which combination stands for the same function?
   (A) Tanh, Fermi, Linear
   (B) Heaviside step, Fermi, Linear
   (C) Logistic, Fermi, sigmoid
   (D) Tanh, Heaviside step, Fermi
   — 1 1 2 1

---

ii. Given the error function $J(\theta) = 3\theta^2 + 4\theta + 4$. Compute at which point θ would settle in after applying gradient descent.
3 3 3 3

29. a.i. Compare the RBF neural network with a multi-layer perception.
7 4 3 3

ii. Determine why curse of dimensionality affects an RBF neural network.
3 4 3 3

(OR)

b. Elucidate how different algorithms can be used to train a recurrent neural network.
10 3 3 3

30. a. Compare and contrast the variations of SOM.
10 3 4 2

(OR)

b.i. Elaborate on the stability – plasticity dilemma.
2 3 4 2

ii. Explain how the ART network resolves stability – plasticity dilemma.
8 3 4 2

* * * * *

9. What is the main objectives of learning?   1 2 2 1
   (A) To train the neural network   (B) To test the neural network
   (C) To choose the correct neural   (D) To choose the correct activation
   network   function

10. What order of activation is used in a feed forward neural network?   1 2 2 1
   (A) Random order   (B) Random permutation
   (C) Topological order   (D) Synchronous

11. Generalization refers to ability to solve   1 2 3 2
   (A) Unknown problems of another   (B) Known problems of another
   class   class
   (C) Unknown problems of same   (D) Known problems of same class
   class

12. For good generalization we should use   1 2 3 2
   (A) Training set only   (B) Training and test sets
   (C) Training, test and validation   (D) Any labelled dataset
   sets

13. Gradient vector G, points in direction of   1 2 3 1
   (A) Steepest ascent   (B) Steepest descent
   (C) Gentle ascent   (D) Gentle descent

14. For a neural network, number of outputs is   1 2 3 3
   (A) Always one   (B) Equal to number of classes
   (C) Equal to number of inputs   (D) Logarithm of number of classes

15. In a Backpropagation algorithm the initial values of weights   1 2 3 3
   (A) Can be set to zero   (B) Can be randomly initialized
   (C) Can be set to 1   (D) Can be set to 0.5

16. In a radial basis function neural network, if the number of RBF neurons is   1 2 3 3
   equal to number of training examples, then the solution to set of weights
   (A) Has a unique solution   (B) Has infinitely many solutions
   (C) Has no solution   (D) Has approximate solution

17. What rule is used to adjust weighs in a radial basis function network?   1 1 3 1
   (A) Delta rule   (B) Hebbian rule
   (C) Backpropagation   (D) Resilient backpropagation

18. In which network number of neurons increase exponentially with   1 2 3 2
   dimension?
   (A) Feedforward network   (B) Radial basis function network
   (C) Elmann network   (D) Jordan network

19. The outputs of output layer are fed back to the input of hidden layer for   1 2 3 1
   which network.
   (A) Feedforwad network   (B) Jordan network
   (C) Elman network   (D) RBF network

20. Recurrent neural networks are trained using   1 1 3 3
   (A) Standard backpropagation   (B) Delta rule
   (C) Resilient backpropagation   (D) Unfolding in time

21. Self organizing maps have _____ different spaces   1 1 4 2
   (A) 2   (B) 3
   (C) 4   (D) 5

22. In self organizing map winner neuron has   1 2 4 2
   (A) Same label as example   (B) Has different label than example
   (C) Farthest cluster centre form   (D) Closest cluster center to example
   example

23. In neural gas   1 2 4 2
   (A) Neurons become flexible with   (B) Neurons stiffen with time
   time
   (C) Neurons do not change with   (D) There is no concept of neurons
   time

24. In multi-SOM, only neurons belonging to _____ are adapted   1 1 4 2
   (A) Winner gas   (B) Winner SOM
   (C) Runner-up gas   (D) Runner-up SOM

25. In art model, reset UNIT   1 1 4 2
   (A) Compares input with cluster   (B) Selects winner neuron
   center
   (C) Can inhibit a neuron if match   (D) Is the input layer
   is not significant

PART – B (5 × 10 = 50 Marks)
Answer ALL Questions

Marks BL CO PO

26. a.i. Compare the human brain with the computer.   5 4 1 1

   ii. Analyze what features of the human brain are beneficial to adapt to   5 4 1 1
   computer systems.

   (OR)

   b. Illustrate and explain electrochemical processes involved in transmission of   10 4 1 1
   nerve impulse.

27. a.i. Illustrate the architecture of neural networks.   8 4 2 1

   ii. Analyze the purpose of activation function in a neural network.   2 4 2 1

   (OR)

   b.i. Differentiate between Elmann and Jordan networks with the aid of a figure.   8 4 2 1

   ii. Reason out the benefit of a bias neuron in neural networks.   2 4 2 1

28. a.i. Discuss how the weights of a single layer perceptron can be learned.   5 4 3 3

   ii. Evaluate the benefit of having many layers of perceptrons with linear   5 4 3 3
   activation, as compared to a single layer. Provide proper justification.

   (OR)

   b.i. Discuss gradient descent procedure along with pitfalls.   7 3 3 3