

B.Tech. DEGREE EXAMINATION, JUNE 2023

Fifth Semester

18CSE388T - ARTIFICIAL NEURAL NETWORKS

(For the candidates admitted during the academic year 2018-2019 to 2021-2022)

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 40 minutes.
- ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours

Max. Marks: 100

Part - A (20 × 1 Marks = 20 Marks)

Answer **All** Questions

		Marks	BL	CO
1. Neurons receives signals from other neurons through		1	1	1
(A) Dendrites	(B) Neocognitron			
(C) Soma	(D) Axon			
2. The membrane potential of neuron in resting state is _____		1	1	1
(A) -70mV	(B) 70mV			
(C) 85mV	(D) -85mV			
3. The calculations are carried out in brain and computer as _____ and _____ respectively		1	2	1
(A) serial, serial	(B) serial, parallel			
(C) parallel, serial	(D) parallel, parallel			
4. _____ part of the brain decides which information should be transferred to cerebrum		1	1	1
(A) Thalamus	(B) Hypothalamus			
(C) Cerebellum	(D) Brain stem			
5. The function of cerebrum is _____		1	2	1
(A) Sensation of pain	(B) Motor coordination			
(C) Abstract thinking	(D) Muscle contraction			
6. The activation function determines the activation of a neuron dependent on _____ and _____		1	1	2
(A) Network input and Weight	(B) Network weight and threshold value			
(C) Network input and threshold value	(D) Network output and Weight			
7. Connections between neurons within one layer are called _____		1	1	2
(A) Lateral recurrences	(B) Direct recurrences			
(C) Indirect recurrences	(D) Recurrences			
8. The Prediction accuracy of neural network depends on		1	1	2
(A) Input and Output	(B) Weight and Bias			
(C) Threshold and activation function	(D) Input and Bias			
9. Sigmoid activation values ranges between		1	1	2
(A) 0 and 1	(B) 0 to infinite			
(C) -1 to +1	(D) 1 to infinite			
10. Choose the neural which best suits for image data		1	1	2
(A) Single layer perceptron	(B) Convolution neural network			
(C) Recurrent neural network	(D) Random Forest			

11. A kind of learning whose features have no label is called as (A) Supervised learning (C) Reinforcement learning	(B) Unsupervised learning (D) Semi supervised Learning	1	1	3
12. Hebbian rule implies that the connection between two neurons is strengthened when both neurons are (A) active at the same time (C) inactive	(B) active at different time (D) proactive	1	1	3
13. When training error is less and test error is high then the model is (A) Over fitting model (C) Best fitting model	(B) Under fitting model (D) Worst fitting model	1	1	3
14. _____ is a technical trick to consider threshold values as connection weights (A) Firing neuron (C) The bias neuron	(B) Active neuron (D) Random neuron	1	1	3
15. A training algorithm in which the weights are changed after every sample presented is called as _____ (A) Offline learning (C) Active learning	(B) Online learning (D) Batch Learning	1	1	3
16. Choose the layers of ART network (A) Input layer , recognition layer (C) Input layer, Hidden layer	(B) Input layer, Output Layer (D) Only one layer	1	1	4
17. Variation of SOM without a static topology is called as (A) neural gas (C) ART	(B) M-SOM (D) Star	1	1	4
18. Learning of neural network without destroying the already existing information is called as (A) Stability (C) Stability & plasticity dilemma	(B) Plasticity dilemma (D) ART	1	1	4
19. In SOM How many output nodes can fire simultaneously (A) Many (C) Two	(B) One (D) Zero	1	1	4
20. In self-organizing maps the active neuron will be the one with _____. (A) Least distance to an input pattern (C) Maximum distance to the input pattern	(B) Least distance to a hidden pattern (D) Maximum distance to the hidden pattern	1	1	4

Part - B (5 × 4 Marks = 20 Marks)
Answer any 5 Questions

21. Explain the components of a biological neuron involved in information processing	4	2	1
22. Explain any two topologies of neural network with neat sketch	4	2	2
23. Explain Hebbian Learning Rule Algorithm	4	3	2
24. Compare RBF networks and multilayer perceptron Network.	4	4	3
25. Illustrate the benefit of training a neural network using teacher forcing over unfolding with an example	4	3	3
26. What is the main benefit of adaptive resonance theory over self-organizing maps?	4	4	4
27. Explain the steps in the training of weights of a self-organizing map	4	2	4

Part - C (5 × 12 Marks = 60 Marks)
Answer All Questions

28. a. Explain the electrochemical process of neuron and describe how action potential is transferred to other neuron with neat diagram. (OR) b. Briefly characterize the four development phases of neural networks and give expressive examples for each phase.	12	3	1
29. a. Explain different activation functions of ANN in detail (OR) b. i) Differentiate between Elmann and Jordan networks with the aid of a figure. ii) Reason out the benefit of a bias neuron in neural networks.	12	2	2
30. a. Explain multilayer perceptron and describe how the weights of different layers are trained in MLP. (OR) b. i) Explain Hebbian learning rule with implementation of AND gate. ii) Explain the strategy to divide the set of training samples.	12	4	3
31. a. Explain the information processing of an RBF network in detail with neat diagrams. (OR) b. Elucidate how different algorithms can be used to train a recurrent neural network.	12	2	3
32. a. Explain the learning process of an ART network in detail. (OR) b. An insurance company with several thousands of customers has decided to analyse its customers in order to understand better why they buy the policy. The company collected data about its customers for the last 2 years. Each customer's profile was stored electronically in a database and fed into a data warehouse, where it was assessed on 50 parameters, discuss how a self-organizing map (SOM) could be used for this analysis. Why would the results, produced by an SOM, be particularly usefull of the reports presented to strategic managers?	12	3	4
