Unit-2

1. The adaptive filtering problem is mainly concerned with:

A) Classification
B) Weight adjustment
C) Clustering
D) Compression

Answer: B) Weight adjustment

2. The objective of the Least Mean Square (LMS) algorithm is to:

A) Maximize error
B) Minimize mean square error
C) Increase learning rate
D) Reduce neurons

Answer: B) Minimize mean square error

3. LMS algorithm was developed by:

A) Rosenblatt
B) Hebb
C) Widrow and Hoff
D) McCulloch

Answer: C) Widrow and Hoff

4. Which learning method is used in ADALINE networks?

A) Hebbian Learning
B) LMS Algorithm
C) Competitive Learning
D) Boltzmann Learning

Answer: B) LMS Algorithm

5. Learning curves represent:

A) Error versus iterations
B) Weight versus neurons
C) Inputs versus outputs
D) Layers versus nodes

Answer: A) Error versus iterations

6. Learning rate annealing refers to:

A) Increasing learning rate continuously
B) Decreasing learning rate gradually
C) Removing weights
D) Adding neurons

Answer: B) Decreasing learning rate gradually

7. A Perceptron is capable of solving:

A) Non-linearly separable problems
B) Linearly separable problems
C) Dynamic programming problems
D) Optimization problems

Answer: B) Linearly separable problems

8. The Perceptron Convergence Theorem states that:

A) Perceptron never converges
B) Perceptron converges for linearly separable data
C) Perceptron works only for XOR
D) Perceptron requires hidden layers

Answer: B) Perceptron converges for linearly separable data

9. Which problem cannot be solved by a single-layer perceptron?

A) AND
B) OR
C) NAND
D) XOR

Answer: D) XOR

10. Bayes classifier is considered:

A) Optimal classifier
B) Random classifier
C) Clustering algorithm
D) Search algorithm

Answer: A) Optimal classifier

11. The output of a perceptron is generally:

A) Continuous
B) Binary
C) Random
D) Analog

Answer: B) Binary

12. Multilayer perceptrons are trained using:

A) Competitive Learning
B) Hebbian Learning
C) Backpropagation
D) Boltzmann Learning

Answer: C) Backpropagation

13. Backpropagation is based on:

A) Error correction learning
B) Competitive learning
C) Reinforcement learning
D) Evolutionary learning

Answer: A) Error correction learning

14. Backpropagation updates weights in:

A) Input layer only
B) Hidden layer only
C) Output layer only
D) All layers

Answer: D) All layers

15. XOR problem requires:

A) Single-layer perceptron
B) No learning
C) Multilayer perceptron
D) Hebbian network

Answer: C) Multilayer perceptron

16. Hidden layers are primarily used for:

A) Data storage
B) Feature extraction
C) Compilation
D) Compression

Answer: B) Feature extraction

17. Feature detection is performed mainly by:

A) Output neurons
B) Hidden neurons
C) Input neurons
D) Bias units

Answer: B) Hidden neurons

18. In backpropagation, error signals propagate:

A) Forward
B) Sideways
C) Backward
D) Randomly

Answer: C) Backward

19. Which activation function is most commonly used in MLPs?

A) Step Function
B) Sigmoid Function
C) Modulus Function
D) Identity Function

Answer: B) Sigmoid Function

20. The decision rule selects:

A) Maximum output neuron
B) Minimum weight
C) Random neuron
D) First neuron

Answer: A) Maximum output neuron

21. Linear Least Square Filters minimize:

A) Absolute error
B) Squared error
C) Percentage error
D) Classification error

Answer: B) Squared error

22. Which network is also called a universal approximator?

A) Single-layer Perceptron
B) MLP
C) ADALINE
D) MADALINE

Answer: B) MLP

23. The gradient descent method is used in:

A) Backpropagation
B) Hebbian Learning
C) Competitive Learning
D) Bayesian Learning

Answer: A) Backpropagation

24. The learning curve generally decreases as:

A) Error increases
B) Training progresses
C) Neurons decrease
D) Inputs decrease

Answer: B) Training progresses

25. XOR stands for:

A) Exclusive OR
B) Extra OR
C) External OR
D) Extended OR

Answer: A) Exclusive OR

Fill in the Blanks

1. The LMS algorithm was proposed by _____ and Hoff.
   Answer: Widrow
2. LMS stands for Least Mean _____.
   Answer: Square
3. Adaptive filters adjust their _____ automatically.
   Answer: Weights
4. Learning curves show error versus _____.
   Answer: Iterations
5. Learning rate is usually denoted by _____.
   Answer: η (eta)
6. Learning rate annealing gradually _____ the learning rate.
   Answer: Decreases
7. Perceptron can solve only _____ separable problems.
   Answer: Linearly
8. The XOR problem is _____ linearly separable.
   Answer: Not
9. The Perceptron Convergence Theorem guarantees convergence for _____ separable data.
   Answer: Linearly
10. Bayes classifier minimizes classification _____.
    Answer: Error
11. A multilayer perceptron contains one or more _____ layers.
    Answer: Hidden
12. The most popular training algorithm for MLP is _____.
    Answer: Backpropagation
13. Backpropagation uses the principle of _____ descent.
    Answer: Gradient
14. Error signals are propagated in the _____ direction.
    Answer: Backward
15. Hidden neurons perform _____ detection.
    Answer: Feature
16. XOR stands for Exclusive _____.
    Answer: OR
17. The output layer produces the final _____.
    Answer: Decision
18. Sigmoid is a commonly used _____ function.
    Answer: Activation
19. Linear least square filters minimize mean square _____.
    Answer: Error
20. ADALINE stands for Adaptive _____ Neuron.
    Answer: Linear
21. MLP stands for Multi-Layer _____.
    Answer: Perceptron
22. Backpropagation updates weights in all _____.
    Answer: Layers
23. The hidden layer increases the network's _____ capability.
    Answer: Learning
24. The output representation determines the final _____ rule.
    Answer: Decision
25. Feature detection is mainly performed by _____ neurons.
    Answer: Hidden