# UNIT-IV

**Fill in the Blanks**

1. Dimensionality reduction helps in reducing the number of _____ in a dataset.
   **Answer:** Features
2. PCA stands for Principal Component _____.
   **Answer:** Analysis
3. Linear Discriminant Analysis is mainly used for _____ problems.
   **Answer:** Classification
4. PCA transforms data into a new set of _____ components.
   **Answer:** Principal
5. Factor Analysis is used to identify hidden _____ in data.
   **Answer:** Factors
6. Independent Component Analysis separates data into statistically _____ components.
   **Answer:** Independent
7. Isomap is a technique used for nonlinear dimensionality _____.
   **Answer:** Reduction
8. Locally Linear Embedding preserves local _____ of data.
   **Answer:** Relationships
9. Least Squares Optimization minimizes the sum of squared _____.
   **Answer:** Errors
10. Genetic Algorithms are inspired by natural _____.
    **Answer:** Evolution
11. In Genetic Algorithms, a possible solution is called a _____.
    **Answer:** Chromosome
12. Mutation and crossover are examples of genetic _____.
    **Answer:** Operators
13. The process of selecting the fittest individuals is called _____.
    **Answer:** Selection
14. PCA is commonly used for data _____.
    **Answer:** Compression
15. Genetic offspring are created from parent _____.
    **Answer:** Chromosomes
16. ICA is widely used in signal _____ applications.
    **Answer:** Separation
17. Isomap preserves _____ distances between data points.
    **Answer:** Geodesic
18. The fitness function measures the quality of a _____.
    **Answer:** Solution
19. In Least Squares Optimization, the best fit minimizes prediction _____.
    **Answer:** Error
20. Evolutionary learning techniques search for optimal _____.
    **Answer:** Solutions

**Multiple Choice Questions (MCQs)**

1. What is the main purpose of dimensionality reduction?
   a) Increase dimensions
   b) Reduce features
   c) Add noise
   d) Increase storage
   **Answer:** b) Reduce features
2. PCA is mainly used for:
   a) Data compression
   b) Sorting
   c) Encryption
   d) Searching
   **Answer:** a) Data compression
3. Which technique is commonly used for supervised dimensionality reduction?
   a) PCA
   b) LDA
   c) K-Means
   d) Apriori
   **Answer:** b) LDA
4. Principal Component Analysis converts correlated variables into:
   a) Independent variables
   b) Principal components
   c) Clusters
   d) Labels
   **Answer:** b) Principal components
5. Which method identifies hidden variables in data?
   a) Factor Analysis
   b) KNN
   c) Decision Tree
   d) Regression
   **Answer:** a) Factor Analysis
6. ICA stands for:
   a) Intelligent Component Analysis
   b) Independent Component Analysis
   c) Internal Cluster Algorithm
   d) Indexed Component Approach
   **Answer:** b) Independent Component Analysis
7. Which technique preserves local neighborhood information?
   a) PCA
   b) LLE
   c) Regression
   d) Bagging
   **Answer:** b) LLE
8. Isomap is mainly used for:
   a) Linear classification
   b) Nonlinear dimensionality reduction
   c) Clustering only
   d) Sorting data
   **Answer:** b) Nonlinear dimensionality reduction

9. Least Squares Optimization minimizes:
   a) Number of dimensions
   b) Squared errors
   c) Tree depth
   d) Clusters
   **Answer:** b) Squared errors
10. Genetic Algorithms are based on the concept of:
   a) Sorting
   b) Evolution
   c) Searching
   d) Encryption
   **Answer:** b) Evolution
11. Which of the following is a genetic operator?
   a) Crossover
   b) Mutation
   c) Selection
   d) All of the above
   **Answer:** d) All of the above
12. In Genetic Algorithms, the quality of a solution is measured by:
   a) Error rate
   b) Fitness function
   c) Cluster size
   d) Accuracy only
   **Answer:** b) Fitness function
13. Which dimensionality reduction technique is unsupervised?
   a) LDA
   b) PCA
   c) Decision Tree
   d) Regression
   **Answer:** b) PCA
14. Genetic offspring are produced from:
   a) Features
   b) Parent chromosomes
   c) Clusters
   d) Layers
   **Answer:** b) Parent chromosomes
15. Which technique is commonly used in signal separation?
   a) ICA
   b) KNN
   c) CART
   d) SVM
   **Answer:** a) ICA
16. The objective of PCA is to maximize:
   a) Noise
   b) Variance
   c) Errors
   d) Dimensions
   **Answer:** b) Variance
17. Which algorithm is inspired by biological evolution?
   a) Decision Tree

b) Genetic Algorithm
c) K-Means
d) Linear Regression
**Answer:** b) Genetic Algorithm

18. Mutation in Genetic Algorithms helps to:
a) Reduce diversity
b) Introduce variation
c) Remove solutions
d) Increase dimensions
**Answer:** b) Introduce variation

19. Which method preserves geodesic distances?
a) PCA
b) Isomap
c) LDA
d) Regression
**Answer:** b) Isomap

20. Evolutionary learning is mainly used for:
a) Optimization problems
b) Sorting data
c) Data storage
d) Encryption
**Answer:** a) Optimization problems