

### Unit-5

1. A dynamical system describes the evolution of a system with respect to:

- a) Distance
- b) Time
- c) Temperature
- d) Frequency

**Answer:** b) Time

2. An equilibrium state occurs when:

- a) State changes continuously
- b) State becomes infinite
- c) Rate of change is zero
- d) Energy is maximum

**Answer:** c) Rate of change is zero

3. A system that returns to its original state after a small disturbance is called:

- a) Unstable
- b) Stable
- c) Chaotic
- d) Random

**Answer:** b) Stable

4. A state toward which a dynamical system converges is called:

- a) Oscillator
- b) Attractor
- c) Predictor
- d) Classifier

**Answer:** b) Attractor

5. Neuro dynamical models are mainly used to represent:

- a) Mechanical systems
- b) Neural activity
- c) Chemical reactions
- d) Electrical circuits only

**Answer:** b) Neural activity

6. Hopfield Network belongs to which category?

- a) Feedforward Network
- b) Recurrent Neural Network
- c) CNN
- d) Decision Tree

**Answer:** b) Recurrent Neural Network

7. Hopfield Network was proposed by:

- a) Geoffrey Hinton
- b) John Hopfield
- c) Yann LeCun
- d) Rosenblatt

**Answer:** b) John Hopfield

8. In Hopfield Network, weights are:

- a) Random
- b) Symmetric
- c) Zero
- d) Negative only

**Answer:** b) Symmetric

9. In Hopfield Network:

- a) Self-connections are allowed
- b) Self-connections are not allowed
- c) Hidden layers exist
- d) Output layer is absent

**Answer:** b) Self-connections are not allowed

10. Hopfield Network is mainly used for:

- a) Clustering
- b) Regression
- c) Associative Memory
- d) Sorting

**Answer:** c) Associative Memory

11. The Hopfield Network reaches a stable state by minimizing:

- a) Distance Function
- b) Cost Function
- c) Energy Function
- d) Error Function

**Answer:** c) Energy Function

12. Restricted Boltzmann Machine is a:

- a) Deterministic Model
- b) Probabilistic Model
- c) Linear Model
- d) Rule-Based Model

**Answer:** b) Probabilistic Model

13. RBM consists of:

- a) Input and Output Layers
- b) Visible and Hidden Layers
- c) Three Hidden Layers
- d) Convolution Layers

**Answer:** b) Visible and Hidden Layers

14. Connections within the same layer in RBM are:

- a) Allowed
- b) Weighted
- c) Restricted
- d) Mandatory

**Answer:** c) Restricted

15. RBM is mainly used for:

- a) Feature Extraction
- b) Signal Amplification
- c) Routing
- d) Modulation

**Answer:** a) Feature Extraction



### Fill in the Blanks

1. Neuro dynamics studies the \_\_\_\_\_ behavior of neural systems.

**Answer:** dynamic (or time-varying)

2. A mathematical model describing system evolution is called a \_\_\_\_\_ system.

**Answer:** dynamical

3. An equilibrium state occurs when the rate of change is \_\_\_\_\_.

**Answer:** zero

4. A stable system returns to its \_\_\_\_\_ state after a disturbance.

**Answer:** equilibrium

5. A state toward which a system naturally evolves is called an \_\_\_\_\_.

**Answer:** attractor

6. Stored memories in Hopfield Networks are represented as \_\_\_\_\_.

**Answer:** attractors

7. Hopfield Network is a \_\_\_\_\_ neural network.

**Answer:** recurrent

8. Hopfield Network was developed by \_\_\_\_\_ Hopfield.

**Answer:** John

9. In Hopfield Network, the weights are \_\_\_\_\_.

**Answer:** symmetric



10. Self-connections in Hopfield Network are \_\_\_\_\_.

**Answer:** not allowed (or absent)

11. The Hopfield Network minimizes an \_\_\_\_\_ function.

**Answer:** energy

12. RBM stands for Restricted \_\_\_\_\_ Machine.

**Answer:** Boltzmann

13. RBM contains visible and \_\_\_\_\_ layers.

**Answer:** hidden

14. RBM is widely used for \_\_\_\_\_ learning.

**Answer:** unsupervised

15. In RBM, neurons within the same layer are not \_\_\_\_\_.

**Answer:** connected

16. RBM is an \_\_\_\_\_ based probabilistic model.

**Answer:** energy

17. Pattern retrieval in Hopfield Networks is achieved through convergence to an \_\_\_\_\_.

**Answer:** attractor

18. The architecture of RBM is \_\_\_\_\_.

**Answer:** bipartite

19. Learning in RBM helps discover hidden \_\_\_\_\_.

**Answer:** features

20. Hopfield Networks are widely used for \_\_\_\_\_ memory applications.

**Answer:** associative