

UNIT-III

MULTIPLE CHOICE QUESTIONS (MCQ)

1. A system that satisfies the principle of superposition is called

- A) Nonlinear system
- B) Linear system
- C) Dynamic system
- D) Time-varying system

Answer: B

2. The output of an LTI system is obtained by

- A) Correlation
- B) Convolution
- C) Differentiation
- D) Integration

Answer: B

3. The response of a system to a unit impulse is called

- A) Step response
- B) Frequency response
- C) Impulse response
- D) Natural response

Answer: C

4. An LTI system stands for

- A) Linear Time Invariant System
- B) Linear Time Infinite System
- C) Low Time Invariant System
- D) Linear Transfer Integration

Answer: A

5. Which system has characteristics that change with time?

- A) LTI system
- B) LTV system
- C) Static system
- D) Memoryless system

Answer: B

6. The transfer function of an LTI system is the ratio of

- A) Output to input in the frequency domain
- B) Input to output in the time domain
- C) Voltage to current
- D) Energy to power

Answer: A

7. An ideal Low Pass Filter passes

- A) High frequencies only
- B) Low frequencies only
- C) All frequencies
- D) No frequencies

Answer: B

8. An ideal High Pass Filter blocks

- A) High frequencies
- B) Low frequencies
- C) All frequencies
- D) Mid frequencies only

Answer: B

9. A Band Pass Filter allows

- A) Low frequencies only
- B) High frequencies only
- C) A specific band of frequencies
- D) No frequencies

Answer: C

10. Distortionless transmission requires

- A) Constant gain and linear phase
- B) Infinite bandwidth
- C) Zero bandwidth
- D) Random phase

Answer: A

11. Signal bandwidth refers to the range of

- A) Time
- B) Amplitude

- C) Frequencies occupied by the signal
- D) Power

Answer: C

12. The bandwidth of a system determines

- A) Its storage capacity
- B) The frequencies it can transmit
- C) Signal energy
- D) Phase angle

Answer: B

13. The rise time of a system is

- A) Directly proportional to bandwidth
- B) Inversely proportional to bandwidth
- C) Independent of bandwidth
- D) Equal to bandwidth

Answer: B

14. Convolution is represented by the symbol

- A) $\times$
- B) $+$
- C) $*$
- D) $\otimes$

Answer: D

15. Correlation is mainly used to measure

- A) Power consumption
- B) Similarity between signals
- C) Bandwidth
- D) Frequency

Answer: B

16. Convolution in the frequency domain becomes

- A) Addition
- B) Multiplication
- C) Integration
- D) Correlation

Answer: B

17. Which of the following is memoryless?

- A) Impulse response
- B) Static system
- C) Dynamic system
- D) LTV system

Answer: B

18. For a causal LTI system, the impulse response is

- A) Zero for $t < 0$
- B) Zero for $t > 0$
- C) Constant
- D) Periodic

Answer: A

19. The Paley-Wiener criterion is related to

- A) Sampling
- B) Physical realization of systems
- C) Fourier Series
- D) Z-Transform

Answer: B

20. Graphical convolution is performed by

- A) Addition only
- B) Folding, shifting, multiplying and integrating
- C) Differentiation
- D) Sampling

Answer: B

FILL IN THE BLANKS (FIB)

1. A system satisfying superposition is called a **linear** system.
2. The response of a system to a unit impulse is called the **impulse response**.
3. LTI stands for **Linear Time Invariant**.
4. LTV stands for **Linear Time Variant**.

5. The transfer function is the ratio of **output** to **input** in the frequency domain.
6. An ideal LPF passes **low** frequencies.
7. An ideal HPF passes **high** frequencies.
8. A BPF passes a **band** of frequencies.
9. Distortion less transmission requires **linear phase** characteristics.
10. Signal bandwidth is measured in **Hertz (Hz)**.
11. System bandwidth determines the range of frequencies a system can **transmit**.
12. Rise time is **inversely** proportional to bandwidth.
13. Convolution of two signals is denoted by $\otimes$.
14. Correlation measures the **similarity** between two signals.
15. In an LTI system, output is obtained by **convolution** of input with impulse response.
16. Convolution in the time domain becomes **multiplication** in the frequency domain.
17. A causal system has an impulse response equal to zero for $t < 0$.
18. The Paley-Wiener criterion is used for **physical realization** of systems.
19. Graphical convolution involves **folding** one signal before shifting.
20. The relationship between bandwidth and rise time is **inverse**.