

UNIT-IV

MULTIPLE CHOICE QUESTIONS (MCQ)

1. Laplace Transform is mainly used for

- A) Image processing
- B) Analysis of linear systems
- C) Data compression
- D) Signal sampling

Answer: B

2. The Laplace Transform converts a signal from

- A) Frequency domain to time domain
- B) Time domain to s-domain
- C) Z-domain to time domain
- D) Frequency domain to Z-domain

Answer: B

3. The variable used in Laplace Transform is

- A) $j\omega$
- B) n
- C) s
- D) z

Answer: C

4. ROC in Laplace Transform stands for

- A) Rate of Change
- B) Region of Convergence
- C) Range of Coefficients
- D) Region of Continuity

Answer: B

5. The inverse Laplace Transform converts

- A) Time domain to frequency domain
- B) s-domain to time domain
- C) Time domain to Z-domain
- D) Frequency domain to s-domain

Answer: B

6. Fourier Transform is obtained from Laplace Transform by setting

- A) $s = 0$
- B) $s = j\omega$
- C) $s = 1$
- D) $s = \infty$

Answer: B

7. Which property states that the transform of a sum is the sum of the transforms?

- A) Linearity
- B) Scaling
- C) Differentiation
- D) Time shifting

Answer: A

8. Cross-correlation is used to measure

- A) Bandwidth
- B) Similarity between two different signals
- C) Signal energy
- D) Signal delay only

Answer: B

9. Auto-correlation is the correlation of a signal with

- A) Another signal
- B) Noise
- C) Itself
- D) Zero

Answer: C

10. Auto-correlation is maximum at

- A) Infinite lag
- B) Zero lag
- C) Negative lag only
- D) Positive lag only

Answer: B

11. Parseval's theorem relates

- A) Signal energy in time and frequency domains
- B) Power and voltage

- C) Bandwidth and frequency
- D) Sampling rate and bandwidth

Answer: A

12. Energy Spectral Density (ESD) is applicable to

- A) Power signals
- B) Energy signals
- C) Periodic signals only
- D) Random signals only

Answer: B

13. Power Spectral Density (PSD) is applicable to

- A) Energy signals
- B) Power signals
- C) Impulse signals
- D) Finite duration signals only

Answer: B

14. The Wiener-Khinchin theorem relates PSD to

- A) Fourier Series
- B) Auto-correlation
- C) Laplace Transform
- D) Sampling theorem

Answer: B

15. Convolution is related to correlation by

- A) No relation
- B) Time reversal of one signal
- C) Integration only
- D) Differentiation only

Answer: B

16. Correlation is commonly used in

- A) Signal detection
- B) Signal generation
- C) Signal sampling
- D) Signal modulation

Answer: A

17. Filtering is mainly used to

- A) Increase noise
- B) Extract desired signal from noise
- C) Reduce bandwidth
- D) Increase frequency

Answer: B

18. A stable signal has an ROC that

- A) Exists
- B) Does not exist
- C) Is always zero
- D) Is always infinite

Answer: A

19. Laplace Transform is more general than

- A) Fourier Transform
- B) Z-Transform
- C) Hilbert Transform
- D) Walsh Transform

Answer: A

20. Detection of periodic signals in noise is commonly done using

- A) Correlation
- B) Differentiation
- C) Sampling
- D) Quantization

Answer: A

FILL IN THE BLANKS (FIB)

1. Laplace Transform converts a signal into the **s-domain**.
2. The variable used in Laplace Transform is **s**.
3. ROC stands for **Region of Convergence**.
4. Inverse Laplace Transform converts the **s-domain** signal back to the **time domain**.
5. Fourier Transform is obtained by evaluating the Laplace Transform along the $j\omega$ axis.
6. The Laplace Transform of a sum of signals satisfies the **linearity** property.

7. Auto-correlation is the correlation of a signal with **itself**.
8. Cross-correlation measures the similarity between **two different signals**.
9. Auto-correlation has its maximum value at **zero lag**.
10. Parseval's theorem relates **time-domain** energy and **frequency-domain** energy.
11. Energy Spectral Density is abbreviated as **ESD**.
12. Power Spectral Density is abbreviated as **PSD**.
13. The Fourier Transform of the auto-correlation function gives the **Power Spectral Density**.
14. Correlation is widely used for **signal detection**.
15. Filtering helps in extracting the **desired signal** from noise.
16. Convolution becomes correlation when one signal is **time-reversed**.
17. The ROC determines the **existence** of the Laplace Transform.
18. Stable systems require an appropriate **ROC**.
19. Correlation is commonly used in the presence of **noise**.
20. Laplace Transform is more **general** than the Fourier Transform.