

UNIT-II

MULTIPLE CHOICE QUESTIONS (MCQ)

1. Fourier series is used to represent

- A) Random signals
- B) Continuous-time periodic signals
- C) Discrete signals only
- D) Aperiodic signals only

Answer: B

2. Fourier series represents a periodic signal as a sum of

- A) Exponential functions only
- B) Sinusoids
- C) Impulses
- D) Step functions

Answer: B

3. Which condition is necessary for the existence of a Fourier Series?

- A) Nyquist condition
- B) Dirichlet's conditions
- C) Shannon theorem
- D) Parseval's theorem

Answer: B

4. The trigonometric Fourier series consists of

- A) Exponential terms only
- B) Sine and cosine terms
- C) Impulse terms
- D) Step functions

Answer: B

5. The exponential Fourier series uses

- A) $e^{jn\omega_0 t}$
- B) e^{-at}
- C) $u(t)$
- D) $\delta(t)$

Answer: A

6. The fundamental frequency is

- A) $2\pi T$
- B) $T/2\pi$

C) $2\pi/T$

D) $1/2T$

Answer: C

7. Fourier Transform is mainly used for

A) Periodic signals only

B) Non-periodic signals

C) Constant signals only

D) Random noise only

Answer: B

8. Fourier Transform is derived from

A) Laplace Transform

B) Fourier Series

C) Z-Transform

D) Hilbert Transform

Answer: B

9. The Fourier Transform of an impulse function is

A) 0

B) 1

C) $j\omega$

D) Infinity

Answer: B

10. The Fourier Transform of a constant signal is

A) Unit step

B) Delta function

C) Ramp function

D) Signum function

Answer: B

11. Which property states that the transform of a shifted signal contains a phase factor?

A) Linearity

B) Time Shifting

C) Duality

D) Scaling

Answer: B

12. Convolution in the time domain corresponds to

A) Addition in frequency domain

B) Multiplication in frequency domain

- C) Integration
- D) Differentiation

Answer: B

13. Multiplication in the time domain corresponds to

- A) Convolution in frequency domain
- B) Differentiation
- C) Addition
- D) Scaling

Answer: A

14. Parseval's theorem relates

- A) Time and frequency energies
- B) Bandwidth and power
- C) Sampling rate and frequency
- D) ROC and stability

Answer: A

15. The Fourier Transform of a periodic signal consists of

- A) Continuous spectrum
- B) Discrete spectral lines
- C) Random spectrum
- D) No spectrum

Answer: B

16. The magnitude and phase of Fourier coefficients together form the

- A) Laplace spectrum
- B) Complex Fourier spectrum
- C) Z-spectrum
- D) Nyquist spectrum

Answer: B

17. Which transform is associated with the analytic signal?

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

Answer: B

18. Fourier Transform exists if the signal satisfies

- A) Dirichlet-like conditions
- B) Nyquist criterion

- C) Sampling theorem
- D) Stability theorem

Answer: A

19. Which property allows differentiation in the time domain to become multiplication by $j\omega$?

- A) Time Differentiation Property
- B) Time Scaling
- C) Duality
- D) Linearity

Answer: A

20. The Fourier spectrum shows

- A) Time variation
- B) Frequency components of a signal
- C) Amplitude only
- D) Phase only

Answer: B

FILL IN THE BLANKS (FIB)

1. Fourier series is applicable to **periodic** signals.
2. Dirichlet's conditions are used to determine the existence of **Fourier series**.
3. The trigonometric Fourier series consists of **sine** and **cosine** terms.
4. The exponential Fourier series uses **complex exponential** functions.
5. The fundamental angular frequency is $2\pi/T$.
6. Fourier Transform is derived from the **Fourier Series**.
7. The Fourier Transform converts a signal from the **time** domain to the **frequency** domain.
8. The Fourier Transform of the impulse function is **1**.
9. The Fourier Transform of a constant is a **delta (impulse)** function.
10. Convolution in the time domain becomes **multiplication** in the frequency domain.
11. Multiplication in the time domain becomes **convolution** in the frequency domain.

12. Parseval's theorem relates **signal energy** in the time and frequency domains.
13. The Fourier Transform of a periodic signal consists of **discrete** spectral lines.
14. The magnitude and phase together form the **Fourier spectrum**.
15. The time-shifting property introduces a **phase shift** in the frequency domain.
16. The Fourier Transform of an even signal is **even**.
17. The Fourier Transform of an odd real signal is **imaginary**.
18. The Hilbert Transform is used to obtain the **analytic** signal.
19. The frequency-domain variable in Fourier Transform is ω (**omega**).
20. Fourier analysis is mainly used to determine the **frequency components** of a signal.