

UNIT-V

MULTIPLE CHOICE QUESTIONS (MCQ)

1. According to the Sampling Theorem, the sampling frequency should be

- A) Less than the highest frequency
- B) Equal to the highest frequency
- C) At least twice the highest frequency
- D) Half the highest frequency

Answer: C

2. The minimum sampling frequency is called the

- A) Carrier frequency
- B) Nyquist rate
- C) Cut-off frequency
- D) Resonant frequency

Answer: B

3. Aliasing occurs due to

- A) Oversampling
- B) Undersampling
- C) High-pass filtering
- D) Amplification

Answer: B

4. Which sampling method uses impulses?

- A) Natural sampling
- B) Flat-top sampling
- C) Impulse sampling
- D) Random sampling

Answer: C

5. In natural sampling, the top of each sample is

- A) Flat
- B) Follows the input signal
- C) Zero
- D) Constant

Answer: B

6. Flat-top sampling is also known as

- A) Sample-and-hold sampling
- B) Random sampling
- C) Pulse sampling
- D) Delta sampling

Answer: A

7. Which filter is used for signal reconstruction?

- A) High-pass filter
- B) Band-pass filter
- C) Low-pass filter
- D) Notch filter

Answer: C

8. The phenomenon in which spectral overlap occurs is called

- A) Quantization
- B) Modulation
- C) Aliasing
- D) Correlation

Answer: C

9. Band-pass sampling is used for

- A) Baseband signals only
- B) Band-pass signals
- C) DC signals
- D) Low-frequency signals only

Answer: B

10. The Z-Transform is mainly applicable to

- A) Continuous-time signals
- B) Discrete-time signals
- C) Analog signals only
- D) Periodic signals only

Answer: B

11. The variable used in the Z-Transform is

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

Answer: C

12. ROC in Z-Transform stands for

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

Answer: B

13. Which transform is the discrete-time counterpart of the Laplace Transform?

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

Answer: C

14. The inverse Z-Transform is used to obtain

- A) Frequency-domain sequence
- B) Time-domain sequence
- C) Power spectrum
- D) Energy spectrum

Answer: B

15. Which property states that the transform of a sum equals the sum of transforms?

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

Answer: A

16. The ROC of a right-sided sequence lies

- A) Inside a circle
- B) Outside a circle
- C) At the origin only
- D) At infinity only

Answer: B

17. The ROC of a left-sided sequence lies

- A) Outside a circle
- B) Inside a circle
- C) Entire z-plane
- D) Unit circle only

Answer: B

18. The Z-Transform of a finite-duration sequence has

- A) No ROC
- B) An ROC excluding poles
- C) Only one pole
- D) Infinite poles

Answer: B

19. The unit circle in the Z-plane is represented by

- A) $|z| = 0$
- B) $|z| = 1$
- C) $|z| = \infty$
- D) $|z| = 2$

Answer: B

20. The Fourier Transform can be obtained from the Z-Transform by evaluating on the

- A) Real axis
- B) Unit circle
- C) Imaginary axis
- D) Origin

Answer: B

FILL IN THE BLANKS (FIB)

1. According to the Sampling Theorem, the sampling frequency must be at least **twice** the highest signal frequency.
2. The minimum sampling frequency is called the **Nyquist rate**.

3. Sampling below the Nyquist rate results in **aliasing**.
4. Impulse sampling uses **impulses** to sample a continuous-time signal.
5. In natural sampling, the top of the sample **follows the input signal**.
6. Flat-top sampling is also called **sample-and-hold** sampling.
7. A **low-pass filter (LPF)** is used to reconstruct the original signal from its samples.
8. Aliasing causes **overlapping** of spectra.
9. Band-pass sampling is used for **band-pass** signals.
10. The Z-Transform is used to analyze **discrete-time** signals.
11. The variable used in the Z-Transform is **z**.
12. ROC stands for **Region of Convergence**.
13. The inverse Z-Transform converts the **z-domain** sequence into the **time-domain** sequence.
14. The Z-Transform is the discrete-time counterpart of the **Laplace Transform**.
15. The Fourier Transform of a discrete-time sequence is obtained by evaluating the Z-Transform on the **unit circle**.
16. The ROC of a right-sided sequence lies **outside** the outermost pole.
17. The ROC of a left-sided sequence lies **inside** the innermost pole.
18. The ROC never contains **poles**.
19. The unit circle in the Z-plane is represented by $|z| = 1$.
20. The linearity property states that the Z-Transform of the sum of two sequences equals the **sum** of their individual transforms.