

Question Bank
Digital and Analog Communication

Unit A

1. Draw the block diagram of a communication system and list advantage of digital communication over analog communication.
2. What are the basic constituents of a communication system.
3. Draw the block diagram of communication system.
4. What is the effect of limited band width on analog and digital signals ? How can this limitation be overcome.
5. Contrast analog and digital signals.
6. Derive the expression for energy spectral density and power spectral density.
7. Explain the properties of fourier transform.
8. Prove the following properties of fourier transform :
 1. Conjugate function.
 2. Time differential theorem.
 3. Time integration theorem.
9. Write the properties of fourier series.
10. Explain the even and odd symmetry in fourier series.
11. What is communication?
12. Give difference between analog and digital signal?
13. Explain real and complex signals.
14. Define fundamental periods.
15. Explain the communication model with help of block diagram and real life example.
16. What is the function of Transmitter and Receiver?
17. Define signal. Classify signals with diagram and example.
18. Explain the properties of signals.
19. What is the effect of limited bandwidth on signals?
20. Give relation b/w frequency and time period, frequency and bandwidth, amplitude and energy of the signal.
21. What is phase? Draw and explain the different phases of a signal.
22. Frequency of a wave motion is 250 Hz. What is its time period?
23. Define frequency. What is the frequency of a wave with a time period of 0.05 seconds?
24. A sound wave travelling in air has a wavelength of 1.6×10^{-2} m. If the velocity of sound is 320 m/s, calculate the frequency of sound.
25. The wavelength and velocity of red light is 7000 \AA and 3×10^8 m/s respectively. Calculate its frequency and time period.
26. What is the difference b/w noise signal and a musical sound?

27. Frieda the fly flaps its wings back and forth 121 times each second. The period of the wing flapping is ____ sec.
28. A period of 5.0 seconds corresponds to a frequency of _____ Hertz.

Unit B

1. Differentiate between Narrow band and Wideband FM. Also list the advantages of FM over AM.
2. What is line coding? Discuss the various line coding techniques with example.
3. Write short notes on AM and PM.
4. Why is a high frequency carrier needed in a communication system.
5. Explain the need of modulation in communication, also how is AM and FM generated.
6. Explain RS 232 and transmission media.
7. What are the various guided and unguided transmission media discuss with suitable diagrams.
8. Write short notes on transmission impairments.
9. Explain the advantages of optical fiber cables over co-axial cables.
10. What is shannon limit? Explain the theorem and write short notes on nyquist theroem.
11. What is fibre optic cable? Discuss its properties and also write its advantages over coaxial cable.
12. Explain the following terms
 - a. Nyquist rate
 - b. Shannon's limit
13. What is modulation and what is the need of modulation.
14. Compare FM and AM.
15. Explain transmission impairments in detail.
16. Explain communication modes.
17. Draw the signal waveforms of data 1100101 using following encoding schemes
18. RZ
19. NRZ-L
20. NRZ-I
21. Manchester
22. Differential Manchester
- 23. Explain physical layer interface RS-232**

24. Give the advantages of X.21 over RS-232.
25. Discuss the advantages and disadvantages of twisted pair, co-axial, optical fibre cables.

Unit C

1. Explain serial and parallel transmission and also write notes on connection oriented and connection less services.
2. Explain sliding window protocol and simplex stop and wait protocol.
3. What are the various communication modes. Also what are protocols.
4. What is a virtual circuit. Write short notes on circuit switching.
5. Write notes on : 1. PSTN, 2. ISDN.
6. Compare the xDSL schemes : 1. ADSL, 2. HDSL, 3. SDSL, 4. VDSL.
7. Explain frequency division multiplexing.
8. Explain Time division multiplexing.
9. Enlist the various kinds of multiplexing.
10. Write short notes on WDM, TDM and FDM.
11. Compare synchronous and asynchronous serial transmission.
12. Explain the following
 - a. Stop and Wait protocol
 - b. Sliding Window protocol.
13. Compare the following Asynchronous and synchronous transmission
14. Define the Simplex, Full duplex communication with suitable example.
15. Why synchronization bit is required in serial communication.
16. What are the BRI and PRI of ISDN?
17. Define the Connectionless and Connection Oriented services.
18. What are the advantages of asynchronous TDM over synchronous TDM?
19. Compare FDM, TDM and WDM
20. Explain in brief- data gram , virtual circuits, permanent virtual circuits
21. What are the flow and transmission control methods?
22. Write short notes on circuit switching, packeting switching and message switching.
23. Explain ADSL in details.

Unit D

1. Explain Hamming code with example, discuss various types of error detecting scheme.
2. Define cryptography and explain its two types.
3. What are the three types of redundancy checks.
4. How is data compression carried out by run length encoding.
5. What do you mean by data encryption standard.
6. Differentiate between secret key and public key cryptography.
7. What is sata compression and discuss Huffman encoding.
8. What is encryption and decryption. Explain techniques.
9. Write notes on error detection.
10. What are forward-error control approaches.
11. Explain data compression technique.
12. Explain CRC with the help of an example.
13. Name the various data encryption techniques and explain any one of them in detail.
14. What is data compression and explain run length encoding.
15. Find out the Huffman encoding of the following message:
Message X_1 X_2 X_3 X_4 X_5 X_6
Probability 0.4 0.32 0.08 0.08 0.08 0.04
16. What are the transmission errors?
17. Explain forward error control approaches.
18. What are error detecting and error correction techniques?
19. Explain hamming code error correction with help of an example.
20. Draw the comparison between secret and public key cryptography.
21. Write short notes on run length and Huffman encoding schemes.