DHANALAKSHMI SRINIVASAN COLLEGE OF ENGINEERING AND TECHNOLOGY

CS6304- ANALOG AND DIGITAL COMMUNICATION

BE-CSE/IT SEMESTER III **REGULATION 2013**

Faculty Name: S.Kalpana, AP/ECE

QUESTION BANK

UNIT –I

ANALOG COMMUNICATION

PART- A

1. Define Noise.
2. List out the types of noise.
3. What is thermal noise?
4. Define Modulation.
5. What is the need for modulation?
6. Write the types of modulation.
7. What is amplitude modulation?
8. Define modulation index of an AM signal
9. A transmitter radiates 9 kW without modulation and 10.125 kW after modulation. Determine depth of modulation.
10. Write the advantages of SSB.
11. Draw the envelope of AM
12. What are the applications of FM?
13. Differentiate between narrow band and wide band FM signals.
14. State Carson's rule of FM bandwidth?
15. Define Phase Modulation.
16. Define frequency deviation.
17. Define the transmission efficiency of AM signal.
18. Distinguish between linear and non- linear modulator.
19. Define Noise Figure and Signal to Noise ratio.
20. For an FM modulator with a peak frequency deviation Δf = 20 kHz, a modulating signal frequency fm = 10 kHz. Find the bandwith using carson's rule.

PART- B

1. Describe the noise with suitable examples.
2. What is the principle of Amplitude modulation? Derive expression for the AM wave and draw its spectrum.
3. Describe the frequency analysis of Angle modulated waves. Explain their Bandwidth requirements.
4. A modulating signal of $2\cos 5000t$ is amplitude modulated over a carrier signal of $5\cos 20000t$. Derive expressions for the modulation index, LSB and VSB frequencies, Bandwidth and the ratio of Side Band Power in the Total Power of AM wave.
5. Explain the principle of Angle Modulation. Derive phase deviation, Modulation index, frequency deviation and percent modulation.
6. Derive the expression for a Amplitude Modulated wave and draw its spectrum.

7. Obtain a relationship between carrier and side band powers in an AM DSBFC wave and explain how power distribution takes place in AM DSB FC system.
8. Define modulation index for FM and PM and obtain the relation between modulation index and modulating signal for FM and PM.
9. Compare various analog communication systems.
10. For an Am DSBFC wave with peak unmodulated carrier voltage Vc=10Vp, a load resistance RL = 10 and a modulation co efficient m = 1. Determine
(i) Power of carrier, upper and lower side band
(ii) Total power of modulate wave
(iii) Total sideband power
(iv) Draw the power spectrum.

UNIT – II
DIGITAL COMMUNICATION
PART – A

1. Write the advantages of digital communication.
2. Define ASK.
3. Define PSK and draw its waveform for the data 10110.
4. Draw the waveforms for PSK and FSK modulation.
5. Define information capacity and bit rate.
6. Differentiate QPSK and BPSK.
7. Define Nyquist sampling theorem.
8. Define minimum Shift keying.
9. Why is ASK called as ON-OFF keying?
10. Define the term Aliasing.
11. What is the relation between bit rate and baud for a FSK system?
12. Define QAM.
13. What is bandwidth efficiency?
14. What are the advantages of QPSK?
15. Draw the constellation diagram of 8-QAM.
16. Compare ASK and FSK.
17. Draw the phasor diagram QPSK.
18. What are the advantages of BPSK?
19. Determine the bandwidth and baud for FSK signal with a Mark frequency of
49 kHz and Space frequency of 51 kHz and a bit rate of 2kbps.
20. Why FSK does require bandwidth when the modulation index is increased?

PART – B

1. For a BPSK modulator with a Carrier frequency of 70 MHz and an input bit rate of 10 Mbps, determine the maximum and minimum upper and lower side frequencies, draw the output spectrum, determine the minimum Nyquist bandwidth, and calculate the baud (Assume f= 5MHz)
2. Draw and explain the operations of Non-coherent and coherent ASK modulators.

3. Explain the principle of FSK transmitter and receiver.
4. Compare the various types of digital modulation techniques.
5. Describe with neat diagram, the operation of a QPSK modulator. Draw its phasor and constellation diagram.
6. Explain the bandwidth considerations of 8-PSK system.
7. What is carrier recovery? Discuss how carrier recovery is achieved by The squaring loop and Costas loop circuits.
8. Explain 8-QAM with suitable diagrams.
9. Draw the block diagram of QPSK modulator and explain its operation. For QPSK modulator, construct the truth table, phasor diagram and constellation diagram.
10. What is known as Binary phase shift keying? Discuss in detail the BPSK transmitter and Receiver and also obtain the minimum double Sided Nyquist bandwidth.

UNIT III
DATA AND PULSE COMMUNICATION
PART – A

1. Name some of the characteristics of data communication.
2. Define Communication standards.
3. What are standards organizations?
4. Draw the block diagram of data communication circuit.
5. Mention the protocols in data communication with example.
6. What is CRC?
7. What are the error detection techniques?
8. What do you mean by redundancy checking?
9. Define DTE.
10. Differentiate parallel and serial interface.
11. Give any four characteristics of IE EE 488 bus.
12. Define PCM.
13. What is sampling.
14. What are the types in sampling?
15. What are the advantages of PCM over PAM?
16. Draw the block diagram of PAM.
17. Define coding efficiency.
18. Define Quantization.
19. What is the need for error control coding?
20. What is Forward error correction?

PART –B

1. Explain the standard organization for data communication.
2. Explain data communication circuits with suitable examples.
3. Describe the features and purposes of serial interfaces. Describe the mechanical, electrical and functional characteristics of RS 232 interface.
4. Determine the VRC and LRC for the following ASCII encoded message. THE CAT. Use odd parity for VRC and even parity for LRC.
5. Determine the BCS for the following data and CRC generating polynomial.

Data G(x) = x10 + x9 + x7+ x5 + x3+ x2 +x1 + x0
CRC 16 polynomial, G(x) = x16 + x15 + x2 + x0
6. What are the types of sampling? Explain the operation of the sample and hold circuit.
7. Explain the generation and detection of PAM and PWM.
8. Explain the analog pulse communication system with neat diagrams.
9. Draw the block diagram of a PCM transmitter, receiver and explain the function of each block.
10. Compare the various pulse communication systems.

UNIT – IV
SOURCE AND ERROR CONTROL CODING
PART – A

1. What is Entropy?
2. State any two properties of Entropy.
3. State the channel coding theorem for the discrete memoryless channel.
4. Define Channel capacity theorem.
5. What is prefix coding?
6. Define mutual information and state its properties.
7. Define Bandwidth efficiency.
8. Define Information rate.
9. Define channel capacity of the discrete memoryless channel.
10. A source is emitting symbols X1, X2 and X3 with probabilities respectively 0.6,0.3 and 0.1. What is the entropy of the source?
11. Name the two source coding techniques.
12. Write down the formula for mutual information.
13. Differentiate lossy source coding from lossless source coding.
14. How does Shannon fano coding differ from lossy source coding?
15. What are the types of the channel?
16. Differentiate error detection from error correction.
17. Find the hamming distance between the following code words C1={1000111}and C2 = {0001011}.
18. What is vertical redundancy checking?
19. State source coding theorem
20. Differentiate between cyclic codes and convolution codes.

PART – B

1. What is Entropy Techniques? Explain in detail.
2. Explain the Information Rate with suitable examples.
3. What is Source Coding Theorem? Explain with suitable examples.
4. Explain the Shannon fano coding & Huffman coding with suitable examples.
5. Explain the Data Compaction and Discrete Memory less Channels in detail.
6. Explain the Differential Entropy & Mutual Information for Continuous Ensembles.
7. Describe the Error Control Codes and its applications in detail.
8. Explain the Convolution codes in detail.
9. Compare the Linear Block Codes and Binary Cyclic Codes in detail.

10. A discrete memoryless source has five symbols x1, x2, x3, x4, x5 with probabilities 0.4, 0.19, 0.16, 0.15 & 0.15 respectively attached to every symbol.

• Construct a Shannon fano code for the source and calculate code efficiency (ŋ).

• Repeat for Huffman code compare the two techniques of source coding

UNIT V
MULTI-USER RADIO COMMUNICATION
PART – A

1. What is GSM?
2. State frequency reuse.
3. What is cell splitting?
4. Compare fixed channel assignment with dynamic channel assignment.
5. State hand off principle.
6. What is MAHO?
7. What are the different types of multiple access techniques?
8. What is the advantage and disadvantage of CDMA?
9. Define satellite communication.
10. Compare geostationary orbit with geosynchronous orbit.
11. Define Kepler's three laws of planetary motions.
12. Define apogee and perigee.
13. What is transponder?
14. Derive the velocity of a geosynchronous satellite.
15. Define look angles of a satellite.
16. What is meant by footprint?
17. What are the basic components of a satellite earth station subsystem?
18. Define Bluetooth.
19. What are the applications of satellite communication?
20. What is the advantage and disadvantage of geostationary satellite?

PART –B

1. Explain in detail Advanced Mobile Phone Systems (AMPS).
2. With neat block diagram explain GSM in detail.
3. Describe the application of CDMA in Wireless communication system.
4. Explain the two common multiple access technique for wireless communication.
5. Compare and contrast TDMA and CDMA techniques.
6. Give a detail account of the different types of multiple access techniques.
7. Explain the Block diagram of satellite communication systems in detail.
8. Explain the Satellite frequency plans and Allocations in detail.
9. Explain the Satellite Access and Satellite Earth Station in detail.
10. Explain in detail: (i) Direct Broadcast Satellite (ii) Bluetooth