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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING
EC2311 Communication Engineering

Unit I - ANALOG COMMUNICATION
PART- A Important Questions

1. Define amplitude Modulation and draw the frequency spectrum of Amplitude modulated signal
2. A 500W carrier is AM modulated to a depth of 75%. Calculate the total power of the modulated wave.
3. Define sensitivity.
4. Define frequency modulation.
5. A 500W carrier is AM modulated to a depth of 70%. Calculate the total power of the modulated form DSBSC of AM.
6. Define Modulation index and percent modulation for an AM wave.
7. Define Low level Modulation and High level Modulation.
8. What is AM wave envelope?
9. What are the disadvantages of conventional (or) double side band full carrier system?
10. AM transmitter radiates 9 kW with the unmodulated carrier and 10.125 kW when the carrier is modulated. Calculate the modulation index.
11. Define AM Vestigial sideband.
12. What are the advantages and disadvantages of single sideband transmission?
13. Define Double sideband suppressed carrier AM?
14. Define frequency deviation.
15. State Carson rule.
16. Mention the advantages and disadvantages of FM.
17. What is the modulation index of FM?
18. The carrier frequency of an FM broadcast transmission is 100 MHZ and maximum frequency deviation is 75 KHZ. Find the Bandwidth of the signal when the highest audio frequency modulating the carrier is 15 KHZ.
19. Write down the basic principle used in superheterdyne receivers?
20. Draw a pre-emphasis circuit.

PART- B Important Questions

1. (i)Explain the generation of frequency modulated signal using reactance modulation scheme with neat diagram.
   (ii)Describe the relationship between FM and PM.

2. (i)Compare wideband andv narrow band FM system.
   (ii)How does the phase shift method efficiently suppress the unwanted side band? explain with diagram.

3. (i)With a neat sketch diagram,explain the operation of Armstrong frequency modulation system.

(ii) Illustrate the operation of VSB transmission.

4. (i)Derive an expression for AM wave and its power relation.
   (ii) What are the advantages of single sideband modulation technique?explain any one method of SSB generation.

5. (i)Derive an expression for the narroband FM wave.
   (ii)Explain the Armstrong method of FM generation.

6. What are the relative merits of high levels modulation and low level modulation in AM transmission? The anode dissipation of a class C power amplifier is 944 Watta when modulation depth is 60% , the efficiency of a power amplifiers is 60%,while that the modulator is 25%.find

(i) Carrier power and modulator tube dissipation when modulation depth is 100%
(ii) AF output and rating of the modulation value to affect 100% modulation
(iii)Overall efficiency at 60% modulation depth

7. Explain in detail Armstrong method of FM generation and compare NBFM and WBFM.
8. Discuss the coherent detection of DSB – sc modulated wave with a block diagram of detector and explain.

UNIT II - DIGITAL COMMUNICATION
PART- A Important Questions

1. What are the elements of Digital Communication systems?
2. What is Pulse Width modulation?
3. How does the phase of the carrier vary for the message m(n) = {1,0,1,1,0,1)
4. Define Slope overload noise. How it is reduced?
5. Specify Nyquist rate of signal f(t) = sin (200t)
6. Draw a pulse position modulated wave.
7. How is PPM obtained from PWM?
8. Write the primary difference between QPSK and MSK systems.
9. What are the different pulse modulation techniques? Discuss their advantages
10. What is meant by the term aliasing?
11. State the applications of FSK
12. Define quantization error?
13. Explain adaptive delta modulation.
14. Define dynamic range.
15. Define ASK, PSK and FSK?
16. Define granular noise. How it is reduced.
17. What is OOK?
18. What is the Nyquist sampling rate? Find nyquist rate for the signal f(t) =sin(200π t)
19. Define PCM and PPM.
20. Define QAM. PAM

PART- B Important Questions

1. With a neat block diagram explain the PAM modulation and demodulation process and derive an expression for PAM wave and depth of modulation.

2. (i)Explain working principle of ASK modulator and detector with neat diagram.
   (ii)Draw ASK,FSK,PSK signal to transmit the data stream 1111000111.

3. (i)With neat sketch explain the generation of delta modulated sinal and derive the expression for SNR.
   (ii)State the drawbacks of DM and suggest a method to overcome it.

4. Explain the QPSK modulation scheme with its constellation diagram.

5. Briefly describe the concept of QAM and draw the constellation diagram of 16 QAM.

6. How does ADM differ from DM?support from your answer with block diagram and waveforms.

7. (i)What is DPSK?discuss its operation with the required diagrams.
   (ii)Compare PCM and DPCM techniques.

8. (i)State and prove sampling theorem.
   (ii)Explain the generation of PWM and PPM waves.

9. (i)Compare PCM and DM.

   (ii)Explain the concept of BPSK and QPSK techniques in data communication.

10. What is meant by quantization ?explain in detail DPCM communication system.

11. Discuss the advantages of digital communications and explain QPSK and QAM techniques with neat diagram.

12. Explain the functioning of a FSK digital transmitter and receiver with relevant diagrams.

UNIT III - SOURCE CODES, LINE CODES & ERROR CONTROL

PART A

1. What is Huffman Coding?
2. What are the features of Huffman Coding
3. State Channel coding theorem.
4. Define entropy
5. Define NRZ, RZ ?
6. Draw the NRZ signalling format of given binary sequence 1101001
7. What are the features of convolutional codes?
8. What is information code?
9. Mention the significance of AMI code?
10. What is the need for multiple access technique?
11. What is prefix code?
12. Define linear block codes and Error control coding.
13. Define information rate.
14. What is channel capacity of binary synchronous channel with error probability of 0.2?
15. State channel coding theorem.
16. Define entropy for a discrete memory less source.
17. What is channel redundancy
18. Write down the formula for the mutual information.
19. Mention few error control codes.
20. Name the source coding techniques.

PART- B Important Questions

1. (i)Brief the properties of entropy.
   (ii)Five symbols of the alphabet of discrete memory less source and their probabilities are given below.

   S={S0 s1 s2 s3 s4}
   P(S)={0.4,0.2,0.2,0.1,0.1}
   Code the symbols using Huffman coding.

2. (i)Briefly discuss on various error control codes and explain in detail with one example for convolution code.
   (ii)Draw the polar,unipolar and Manchester NRZ line code format for an information {1 0 1 1 0 1}

3. (i)Write in detail the procedure of Shannon – fano coding scheme.
   (ii)Apply the above Shannon – fano algorithm to a source whicgh generates symbols x1,x2,x3,x4 with the probabilities 1/8,1/2,1/4 and 1/8 respectively and determine the coding efficiency.

4. (i)Compare the coding schemes HDBP and MBNP codes in terms of bandwidth,SNR and transmission efficiency.
   (ii)Describe bandwidth trade off.

5. (i)Describe bandwidth- SNR trade off problem of coding.
   (ii)Discuss any one of the decoding methods of convolutional coding precisely.

6. Explain the coding and decoding process of block codes.

7. (i)With suitable examples ,explain Shannon fano encoding scheme.
   (ii)Explain Huffman coding with suitable example.

8. With suitable examples,explainthe various line coding techniques.

9. Discuss in detail binary symmetric channel and binary erasure channel.find the Shannon – fano code for the following seven messages with probabilities indicated.

10. Explain the concept of block codes and coding efficiency.find the Huffman code for the following seven messages with probabilities as indicated.
11. Explain briefly about Huffman coding.
12. Explain briefly about Convolution and block codes with neat block with example.

Unit IV - MULTIPLE ACCESS TECHNIQUES

PART- A Important Questions

1. What are the loss producing mechanisms in a wireless channel?
2. List the merits and demerits of CDMA?
3. What is the need for multiple access technique?
4. Define FDMA
5. Define TDMA
6. Define SDMA. What are the advantages of SDMA?
7. What is multiplexing?
8. Difference between FDMA and TDMA?
9. Define Near-far problem?
10. Draw the block diagram of typical FDMA system?
11. What do you mean by multiple access and mention a few MA techniques?
12. Advantages of FDMA over TDMA?
13. Distinguish CDMA and SDMA?
14. Mention the Advantages of CDMA?
15. Mention the Applications of CDMA?
16. List the applications of SDMA in wire and wireless communication
17. Drawbacks of TDMA
18. Define multiple accesses
19. Briefly explain the multiple access technique used in satellite link.
20. Mention the applications of multiple access technique in wired communication.

PART- B Important Questions

1. (i)Consider that a source is transmitting equiprobable 1/0 at the rate of 1063 b/s and the probability of error is Pe = 1/16.determine the rate of transmission.
   (ii)Discuss the BSC and BEC with their channel diagram and transition matrix.
2. Draw and explain the block diagram of transmitter and recdieiver of CDMA.
3. Draw and explain the block diagram of transmitter and recdieiver of SDMA.
4. (i)Discuss the various multiple access accesss techniques used in wireless communication with their merits and demerits.
5. With neat block diagram explain the frequency division multiple access technique.discuss its application in communication.
6. (i)Describe the application of FDMA in wireless communication.
   (ii)Compare the performance of CDMA with FDMA and TDMA.
7. With a neat block diagram,explain the operation of a typical TDMA system and compare with FDMA.
8. Discuss the concept of CDMA techniques and mention its merits and demerits.
9. Discuss in detail about TDMA and FDMA techniques.
10. Discuss in detail about CDMA techniques and compare its performance with TDMA and FDMA.
11. How is interference avoided by using code division multiplexing? Explain .

12. Discuss in detail the concept of TDMA and SDMA and their applications in wire and wireless communication.

UNIT V - SATELLITE, OPTICAL FIBER – POWER LINE, SCADA

PART- A Important Questions

1. Define azimuth angle.
2. What is the necessity of cladding for an optical fibre?
3. Mention the types of sources and detectors used in optical fiber communication systems
4. What is meant by power line carrier communication?
5. What are the major categories of satellite?
6. What are types of optical fiber cable available?
7. What are essential components of satellite systems?
8. Define line of nodes.
9. What is the necessity of cladding for an optical fiber?
10. Write down the uplink and downlink frequencies used in satellite communication.
11. List the merits and de-merits of geosynchronous satellite.
12. What are the types of optical fiber mode structure?
13. Define a fiber optic system.
14. Define refractive index.
15. Define single mode and multi-mode propagation.
16. Define acceptance angle.
17. Define numerical aperture and Snell's law.
18. Define modal dispersion.
19. What is the principle function of an earth station transmitter of a satellite?
20. What are the advantages of laser optical source over LED?
21. What is geo-synchronous orbit, geo- synchronous satellite?

PART- B Important Questions

1. (i)Compare optical fiber with RF cable.

   (ii)Distinguish among single mode step index, multimode step index and multimode gradedindex optical fibers.

2. Give short notes on the following:

   a)satellitesubsytems,
   b)power line carrier systems.

3. (i)Draw the block diagram of satellite link and explain .
   (ii)Write a brief note on INSAT.

4. (i)Describe the pribnciple of operation of power line carrier communixcation.
   (ii)Draw the block diagram of optical fiber communication link and explain.
5. Explain the characteristics of sources and detectors used in optical fiber link with the following parameters:

-LED output power of 30MW
-four 5 Km sections of optical cable each with a loss of 0.5 db/km
-three cable to cable connectors with a loss of 2 db each
-no cable splices
-light source to fiber interface loss of 1.9 dB
-fiber to light defector loss of 2.1 dB
-no losses due to cable bends.

6. Explain types and multiple access techniques in satellite communication.

7. (i)Explain the satellite link budget.
   (ii)Explain the uploink and downlink model of satellite communication system.
8. With neat sketch explain the various blocks and its functionalities of a fiber optic communication system.
9. Explain the concept of satellite communication system and its applications.

10. write short notes on:
a) Optical sources and detectors
b) SCADA

11. Explain the different types of satellites.
12. Explain the different types of fibers used