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EC8395 COMMUNICATION ENGINEERING

PART B & PART C QUESTIONS

Unit I

1. i) Explain a method of generating a DSBSC using balanced modulators. ii) Discuss the principle of AM super heterodyne receiver with block diagram.
2. Illustrate the Armstrong method of FM generation and compare NBFM and WBFM.
3. (i) Identify an Expression for the amplitude modulated wave, its current and power relations. ii) Interpret the expressions for narrowband and Wideband FM wave.
4. Construct frequency discrimination method of generating SSB modulated wave and a method to demodulate it. Discuss the design issues involved in this method of generation. What is the cause and effect of phase error in demodulated signal?
5. Define Amplitude modulation and explain its generation using square law and switching modulators with the help of mathematical expressions.
6. Analyse the operation of Foster-seeley discriminator with the Schematic diagram and Vector diagrams.

Unit II

1. State and prove sampling theorem. Obtain the reconstructed signal and explain about aliasing?
2. With a neat block diagram, describe the PAM modulation and demodulation process and develop an expression for PAM wave.
3. What are line codes and its characteristics? Discuss on various line coding formats.
4. Explain DPCM with required diagram. How does it differ from PCM?
5. i) Explain in detail Time division multiplexing and Frequency division multiplexing. (8)
ii) Compare and contrast TDM and FDM
6. With neat sketch explain the generation of DM signals. State the drawbacks of DM and suggest a method to correct it.

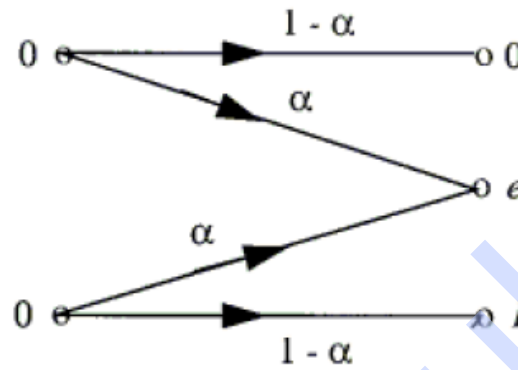
Unit III

1. With a neat block diagram, explain BPSK transmitter and receiver. Also analyse the spectrum and bandwidth considerations of BPSK.
2. i) Explain the QPSK modulation schemes with its constellation diagram.(10)
ii) Briefly describe the concept of QAM and draw the constellation diagram of QAM.(5)
3. i) A data bit sequence consists of the following string of bits 10 11 10 10. Evaluate and draw the nature of waveform transmitted by BPSK transmitter.(8)
(ii) For an 8 PSK modulator with an input data rate equal to 10 Mbps & a carrier frequency of 70 MHz, measure minimum double sided Nyquist bw, Baud rate, Sketch the output spectrum. Judge the results with BPSK & QPSK modulators.
4. Analyse Duo binary signalling scheme with and without precoder and explain.
5. Discuss the operation of a QPSK transmitter with neat diagram. Draw its waveform and phasor diagram

Unit IV

1. Explain the need for source coding and channel coding. State and explain Shannon's theorems on source coding, channel coding and channel capacity.
2. Six symbols of the alphabet of discrete memory less source and their probabilities are given below, $S=\{S_0, S_1, S_2, S_3, S_4\}$ $P(S)=\{0.4, 0.19, 0.16, 0.15, 0.15\}$. Code the symbols using Huffman coding and Shannon Fano coding and compare the efficiency.
3. i) Compare Linear and Convolution codes. (4) ii) Analyse the conditions which hamming codes has to satisfy. (4) iii) Explain the following terms Code efficiency, Channel data rate and code rate. (5)
4. The parity check matrix of a particular (7,4) linear block code is given by, $[H]=[111110 \ 101 \ 010101100 \ 0 \ 0 \ 1]$

- i) Find the generator matrix (G).
 - ii) List all the code vectors.
 - iii) What is the minimum distance between code vectors?
 - iv) How many errors can be detected? How many errors can be corrected?
5. The source of information A generates the symbols {A0, A1, A2, A3 & A4} with the corresponding probabilities {0.4, 0.3, 0.15, 0.1 and 0.05}. Encoding the source symbols using binary encoder and Shannon-Fano encoder and compare its efficiency.
 6. i) Predict the main idea of Source Coding Theorem with suitable examples. (8)
 ii) The binary erasure channel has two inputs and three outputs. The inputs are labeled 0 and 1, and the outputs are labeled 0, 1 and e. A fraction α of the incoming bits are erased by the channel. Measure the capacity of the channel.



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7. An analog signal is band limited to B Hz and sampled at Nyquist rate. The samples are quantized into 4 levels. Each level represents one message. The probabilities of occurrence are $p_1=p_3=1/8$ and $p_2=p_3=3/8$. Solve the information rate of the source.

Unit V

1. (i) Compare the performance of TDMA, FDMA and CDMA. (ii) Describe briefly about the applications of SS modulation.
2. With neat block diagram explain the frequency division multiple access technique. Discuss its application in communication.
3. State the need for spread spectrum modulation and explain its operation with neat block diagram.
4. Classify SS modulation technique based upon the operating concept and explain in detail DSSS and FHSS.
5. State the need for spread spectrum modulation and explain its operation with neat block diagram.
6. (i) Distinguish between FDMA and TDMA technique. (8)
 (ii) Explain the application of CDMA in wireless communication. (5)
7. List out various multiple access techniques and explain any two in detail. Write merits of each technique.

Questions Are Expected for University Exams This May or may Not Be Asked for Exams

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