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B.E. / B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

BIO-MEDICAL ENGINEERING BRANCH

FOURTH SEMESTER

BM 9254 – ANALOG AND DIGITAL COMMUNICATION

Time: 3 hr

(REGULATIONS 2008)

Max Mark: 100

Answer ALL Questions

Part – A (10 X 2 = 20 Marks)

1. What is the need for modulation?
2. state Carson's rule and find the bandwidth of the FM system using Carson's rule, which has the maximum value of frequency deviation is 75KHz and the modulating frequency is 15 KHz.
3. Draw the waveform for the digital signal [0110 1001], while it is transmitted with Bipolar return-to-zero signaling format.
4. What is Vocoder?
5. State Nyquist criteria.
6. What is the function of an Equalizer?
7. A discrete data source produces messages from a set $\{x_1, x_2, x_3, x_4\}$ where the probabilities associated with the messages are $P_1=1/2$, $P_2=1/4$, $P_3=1/8$ and $P_4=1/8$. Find the Entropy.
8. If a channel has 1MHz bandwidth and provides 30dB SNR at the input of a detector Calculate the capacity of the channel.
9. Define Spread-Spectrum modulation.
10. Compare FDMA, TDMA and CDMA.

Part – B (5 X 16 = 80 Marks)

11. (i). With neat diagram, explain the operation of Balanced Modulator circuit and derive its output . (8)
(ii). Describe the Armstrong method of FM generation in detail. (8)
12. (a). (i). Draw the Block Diagram of DPCM and explain the function of each Block. (8)
(ii). Discuss the Quantization process in detail. (8)

(or)

- (b). (i). Describe the various line coding format with an example. (8)
(ii). With the help of diagram, explain the concept of Frequency division multiplexing. (8)

13. (a). (i). Draw the Block diagram of BPSK and explain its operation in detail. (8)
(ii). Discuss the Duo binary signaling scheme in detail. (8)

(or)

- (b).(i). Explain in detail about the QAM techniques with relevant diagrams. (8)
(ii). Describe the working principles of adaptive equalizer. (8)

14. (a). A discrete memoryless source has an alphabet of five symbols $\{S_i, i=1,2,3,4,5\}$ with probabilities $\{0.55, 0.15, 0.15, 0.10, 0.05\}$
(i). Encode the symbols using Huffman coding technique. (6)
(ii). Encode the same using Shannon-Fano coding technique. (6)
(iii). Calculate the efficiency offered by the above two techniques and compare. (4)

(or)

- (b). The convolutional encoder has two generator sequence of $(1,1,1)$ and $(1,0,1)$. Encode the message sequence (10011) , using time domain method and transform domain method. Compare the results.

- 15.(a). Discuss the frequency-Hop spread spectrum technique in detail.

(or)

- (b). Describe the concepts of FDMA, TDMA and CDMA in detail.