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

INFORMATION TECHNOLOGY

THIRD SEMESTER

EC 9212 – COMMUNICATION TECHNIQUES

Time: 3 hr

(REGULATIONS 2008)

Max Mark: 100

Answer ALL Questions

Part – A (10 X 2 = 20 Marks)

1. List the advantages of SSB modulation technique.
2. A Carrier frequency of 5 MHz and peak value of 5V is amplitude modulated by a 4 KHz sine wave of amplitude 3V. Determine the modulation index, the upper and lower sideband frequencies and their amplitudes.
3. What is the function of compander?.
4. State sampling theorem for band limited signals of finite energy.
5. What is pulse shaping? Name a technique.
6. What is the function of an Equalizer?
7. Consider an AWGN channel with 10 MHz bandwidth and the noise power spectral density $\eta/2 = 10^{-12}$ w/Hz. The signal power required at the receiver is 1 mw. Calculate the Capacity of this channel.
8. 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.
9. Draw the idealized model of baseband spread-spectrum system.
10. A spread-spectrum communication system has the information bit duration of 4.095 ms and PN chip duration of 1 μ s. Find the processing gain and the length of the shift-register.

Part – B (5 X 16 = 80 Marks)

11. (i). Explain the operation of Balanced frequency discriminator circuit and discuss its frequency response. (8)
(ii). With suitable sketch, explain the functions of superheterodyne receiver? (8)
12. (a). (i). Describe the different types of sampling process involved in digital communication systems. (8)
(ii). Explain the concept of Time Division Multiplexing in detail. (8)

(or)

- (b). (i). Draw the Block Diagram of DPCM and explain the function of each Block. (10)
(ii). Briefly explain the functions of vocoder.. (6)

13. (a).(i). Explain in detail about the QAM techniques with relevant diagrams. (8)
(ii). What is ISI? Discuss a technique to reduce ISI in detail. (8)
(or)

- (b).(i). Draw the Block diagram of BPSK and explain its operation in detail. (8)
(ii). Describe the working principles of adaptive equalizer. (8)

14. A DMS X has five symbols x_1, x_2, x_3, x_4 and x_5 with respective probabilities 0.2, 0.15, 0.05, 0.1 and 0.5.

- (i). Construct Shannon Fano code for X and calculate code Efficiency (8)
(ii). Repeat (a) with Huffman code. (8)

(or)

- (b). (i). Construct the (7,4) cyclic Hamming Encoder and explain its operation. (8)
(ii). A bit stream 10011101 is transmitted using the standard CRC method. The generated polynomial is X^3+1 . Show the actual bit stream transmitted. Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receiver's end. (8)

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

(or)

- (b). Explain in detail about the direct sequence spread spectrum, with help of Coherent Phase-shift keying technique.