B.Tech Degree IV Semester Examination April 2011

CS/IT 406 DATA COMMUNICATION

(2006 Scheme)

Time : 3 Hours | Maximum Marks : 100

PART - A

(Answer *ALL* questions)

(8 x 5 = 40)

I. (a) What is free space loss? Write down the expression for free space loss of an antenna. Determine the isotropic free space loss at 4 GHz for the shortest path to a synchronous satellite from earth.

(b) Define channel capacity. The intended capacity of a given channel is 20 M bps, and the bandwidth is 3 MHz. Assuming white thermal noise, what signal to noise ratio is required to achieve this capacity.

(c) Explain briefly, with necessary diagrams, the Delta modulation transmitter.

(d) What is a modem? List the different types of modems.

(e) Explain briefly the encoding process, in which the Hamming code is employed.

(f) Explain briefly, the frame structure of HDLC.

(g) Why is a statistical time division multiplexer more efficient than a synchronous time division multiplexer?

(h) Explain briefly, with necessary diagrams, the concept of spread spectrum Digital Communication System.

PART – B

(4 x 15 = 60)

II. What are the various transmission impairments? How do they affect the information carrying capacity of a communication link? (15)

OR

III. Explain the structure, transmission characteristics and applications of different guided transmission media. (15)

IV. (a) Explain the signal encoding techniques (i) Bipolar AMI (ii) B8ZS (iii) HDB3. (9)

(b) The binary data "1 1 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 1 0" in transmitted over a base band channel. Draw the waveforms for the transmitted data using the following formats : (i) Bipolar AMI (ii) B8ZS (iii) HDB3. (3)

(c) Write down the bandwidth equations for AM, FM and PM. (3)

OR

V. (a) Determine the Huffman code for the following messages with their probabilities given :

x_1	x_2	x_3	x_4	x_5	⟶ Symbols
0.2	0.15	0.05	0.1	0.5	⟶ Probabilities

Compute the code efficiency (?) (10)

(b) What is Q AM? (5)

VI. What is CRC? List the three different ways in which CRC algorithm can be described. (15)

OR

VII. What is ARQ? Explain the three standard versions of ARQ. (15)

VIII. (a) Explain how synchronous TDM works. (10)

(b) Write a short note on 'ADSL'. (5)

OR

IX. (a) Explain the principle of operation of a 'DSSS' system. (10)

(b) Write a short note on CDMA. (5)

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