First Semester M.Tech. Degree Examination, June/July 2011

Advanced Digital Communication

Time: 3 hrs.　　　　　　　　　　　　　　　　　　　　　　Max. Marks:100

Note: *Answer any FIVE full questions.*

1　a.　Describe with a block diagram, the working of a PCM system. **(10 Marks)**
　　b.　State and explain Shannon's channel capacity theorem. If the maximum data rate sent on a channel of band width 3 KHz is 64 kbps, find the signal to noise ratio of the channel. **(10 Marks)**

2　a.　Bring out the differences between frequency domain characterization and time domain characterization of communication channels. **(10 Marks)**
　　b.　An analog television signal is lowpass signal with a bandwidth of 2.4 MHz. What bit rate is required if we quantize the signal and require an SNR of 20 dB? **(06 Marks)**
　　c.　Describe the steps involved in digitization of analog signals. **(04 Marks)**

3　a.　Define line coding. Describe the different design considerations in selection of a line coding technique. Differentiate between different encoding schemes and specify the advantages. **(12 Marks)**
　　b.　Suppose a header consists of four 16-bit words (11111111 11111111 11111111 00000000, 11110000, 11110000, 11000000 11000000). Find the internet checksum for this code. **(08 Marks)**

4　a.　Describe and define a discrete memoryless channel. **(08 Marks)**
　　b.　What is binary symmetric channel? **(04 Marks)**
　　c.　State and explain properties of mutual information, in brief. **(08 Marks)**

5　a.　A discrete memoryless source with alphabet $\{S_0, S_1, S_2\}$ and with respective probabilities of $\frac{1}{4}, \frac{1}{2}, \frac{1}{4}$ is available. Calculate the entropy of the source. **(08 Marks)**
　　b.　Explain channel capacity. **(08 Marks)**
　　c.　Calculate the channel capacity of the telephone channel for a signal-to-noise ratio of 40 dB. **(04 Marks)**

6　a.　With a neat diagram, explain the transfer characteristic of a quantiser of mid treed type. **(10 Marks)**
　　b.　With a neat diagram, explain the binary data transmission of a baseband system. **(10 Marks)**

7　a.　What is adaptive subband coding method and why is it used? **(10 Marks)**
　　b.　Draw the block diagram of ASBC and explain various steps involved. **(10 Marks)**

8　　Write short notes on : **(20 Marks)**
　　a.　T1 carrier system
　　b.　Inter symbol interference
　　c.　Adaptive equalization
　　d.　Eye patterns

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