

6E3089

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B. Tech. VI Semester (Main/Back) Exam. May/June, 2013

**ELECTRONICS & COMMUNICATION ENGINEERING # 6EC4****DIGITAL COMMUNICATION****Time : 3 Hours****Min. Passing Marks : 24****Maximum Marks : 80****Instruction to Candidates :**

Attempt any *five* questions, selecting *one* question from *each* unit. All questions carry *equal* marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.)

**Unit-'I'**

1. Explain PCM in terms of modulation and demodulation. Derive and state Sampling Theorem. Also explain Compounding. [16]

**OR**

1. Explain : [16]  
 (i) Matched filter Detection.  
 (ii) Error probability in PCM system.  
 (iii) ADM & T1 carrier system.

**Unit-'II'**

2. Derive the Nyquist's criterion for distortion-less base band binary transmission in absence of noise. Also, explain bipolar & manchester coding. [16]

**OR**

2. Explain Inter symbol Interference. Also, explain raised cosine spectrum. [16]

**Unit-'III'**

3. Draw and explain ASK, BPSK, FSK, QPSK, MSK modulation techniques. Also explain coherent detection of these techniques. [16]

**OR**

3. Calculate the error probabilities for various modulation techniques (i.e. ASK, FSK, PSK). Also explain orthogonalization. [16]

**Unit-'IV'**

4. Explain : [16]  
 (i) Average information  
 (ii) Entropy.  
 (iii) Information rate  
 (iv) Shannon's Theorem.  
 Find the Shannon limit for channel having infinite bandwidth.

**OR**

4. Consider a discrete memory less source with entropy  $H(S)$ . Show that  $H(S)$  is bounded as follows.  
 $0 \leq H(S) \leq \log_2 k$  where  $k$  is radix of alphabets of the source. Also explain Huffman coding. [16]

**Unit-'V'**

5. Given a generator polynomial  
 $g(D) = 1 + D + D^3$  of a (7, 4) cyclic code, construct the 4-by-7 generator matrix  $G$  and draw the encoder for this cyclic code. Show the contents of shift register in the encoder for message sequence 1001. [16]

**OR**

5. Explain and compare cyclic code and convolutional code. Also, explain their encoding and decoding techniques. [16]