

Code No: R5310406

III B.Tech I Semester(R05) Supplementary Examinations, December 2009

DIGITAL COMMUNICATION  
(Electronics & Communication Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions  
All Questions carry equal marks

 KOTTAM  
INSTITUTIONS

1. (a) Draw the block diagram of digital communication system and explain each block in detail.  
(b) Mention the advantages of digital communication over analog communication. [12+4]
2. (a) For a sinusoidal modulating signal  $m(t) = A \cos mt$  applied to a delta modulator with step size  $\Delta$ . Derive an expression for no slope overload condition.  
(b) For a sinusoidal modulating signal  $m(t) = A \cos mt$ , find the maximum output signal to quantization noise ratio in a DM system under the assumption of no slope overload. [6+10]
3. (a) Write down the modulation waveform for transmitting binary information over base band channels, for the following modulation schemes: ASK, PSK, FSK and DPSK.  
(b) What are the advantages and disadvantages of digital modulation schemes?  
(c) Discuss base band transmission of M-ary data. [4+6+6]
4. (a) Mention the drawbacks in duo - binary coding and how these drawbacks can be overcome by using modified duo - binary coding.  
(b) Derive an expression for error probability of modified duo - binary PAM system. [8+8]
5. X, Y are two random variables with probabilities  
 $P(X = x, Y = y) = P(x, y)$   
Show that  $I(X; Y) \geq 0$ , where the equality holds if and only if X and Y are statistically independent.  
[Note: use the inequality in  $u < u - 1$ , for  $0 < u < 1$ .  
To show that  $-I(X; Y) \leq 0$ . [16]
6. (a) Calculate the bandwidth limits of Shannon-Hartley theorem.  
(b) What is an Ideal system? What kind of method is proposed by Shannon for an Ideal system?[16]
7. (a) Prove that "all the  $2k$  n-tuples of co-set have same syndrome and syndromes of different co-sets are different.  
(b) Describe the procedure for the decoding of one-to-one correspondence between co-set leader and a syndrome. [16]
8. Explain various methods for describing Conventional Codes. [16]