

End Semester Examinations - 2015-16 Even Semester - May 2016

14EC2021 Digital Communication

Set A

Time : 3 hrs
Total Marks: 100

1. A. What is Intersymbol interference? Obtain the Nyquist criterion for distortionless baseband binary transmission. Explain ideal Nyquist channel with the help of ideal and practical solution. (15)
B. PSK systems cannot have non-coherent receivers. Why? (5)

OR
2. A. Why MSK is termed as shaped QPSK? Explain with a neat schematic transmitter, receiver and waveforms in MSK. (15)
B. In eye pattern, noise is not related to opening or closing of eye. Is that true. Justify. (5)
3. A. Explain M-ary PSK system with the help of transmitter and receiver? (10)
B. With a neat block diagram and suitable wave forms narrate on the transmitter, receiver and signal space representation of QASK? (10)

OR
4. A. Consider a discrete memory source with seven possible symbols x_i , $i=1,2,3,4,5,6,7$ and the corresponding probabilities $P(x_1)=0.37$, $P(x_2)=0.46$, $P(x_3)=0.30$, $P(x_4)=0.12$, $P(x_5)=0.03$, $P(x_6)=0.02$, $P(x_7)=0.01$. Determine the code word, L_{\min} and efficiency of the code using Huffman coding schemes. (15)
B. State the properties of entropy? (5)
5. A. Consider a discrete memory less source with source alphabet $S = \{s_0, s_1, s_2\}$ with probabilities $P(s_0)=1/4$; $P(s_1)=1/4$; $P(s_2)=1/2$. Prove $H(s^n) = nH(s)$ (8)
B. Obtain the generator and parity check matrices for a (6,3) code whose parity digits are given as $C_4 = d_1 + d_2 + d_3$; $C_5 = d_1 + d_2$; $C_6 = d_1 + d_3$; Decode the received word 101100. (8)
C. Give the measure of surprise before and after the occurrence of an event. Support your answer. (4)

OR
6. A. With a neat sketch and suitable wave forms explain delta modulation and adaptive delta modulation? (15)
B. State Sampling theorem. (5)
7. A. With a neat sketch explain Pulse Code Modulation? (15)
B. Narrate on the various types of Quantization? (5)

OR
8. A. Derive an expression for Quantization noise? (10)
B. Draw the signal representation for unipolar RZ, unipolar NRZ and bipolar RZ, bipolar NRZ? (5)
C. Consider the analog signal $x(t) = 3\cos 50\pi t + 10\sin 300\pi t - \cos 100\pi t$. What is the Nyquist rate and Nyquist interval for this signal? (5)
9. A. Draw the block diagram of frequency hop spread spectrum system and explain fast and slow frequency hopping technique. (10)
B. A Convolutional encoder with constraint length 3 and rate $1/2$ has two generating functions $g^1(101)$ and $g^2(111)$. Draw the trellis diagram and state diagram for the encoder. Obtain the encoded message for $m(1111)$ using maximum likelihood encoding (10)

Wishing you All the Best
