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Question Paper Code : 11215

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

Sixth Semester

Electronics and Communication Engineering

EC 1351 A – DIGITAL COMMUNICATION TECHNIQUES

(Regulation 2008)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A (10 × 2 = 20 Marks)

1. Define the term “Quantisation”.
2. What is the need for a pre-alias filter ?
3. What is inter symbol interference ?
4. What is eye pattern ?
5. Draw the signal-space diagram and show the signal constellation for coherent binary FSK system.
6. What is MSK ? What are its advantages over an ordinary binary FSK ?
7. Prove that $GH^T = HG^T$ for a systematic linear block code.
8. Draw the block diagram of decoder for cyclic code.
9. What is meant by direct sequence ?
10. Define processing gain and jamming margin.

PART – B (5 × 16 = 80 marks)

11. (a) (i) What is meant by sampling ? Explain flat sampling process with a neat diagram. (5)
(ii) What is meant by companding ? Explain μ -law companding. (5)
(iii) Draw the block diagram of adaptive delta modulation systems and explain each block in detail. (6)

OR

- (b) (i) Draw the block diagram of PCM system and explain the function of each block. (10)
(ii) A PCM system uses a uniform quantizer followed by a 7 bit binary encoder. Determine the output SNR_q when a sinusoidal modulating wave of frequency 1MHz is applied to its input. (6)
12. (a) Derive an expression, for minimum error probability and impulse response of matched filter. (16)

OR

- (b) Explain in detail, the operation of duo binary encoder without and with precoder. (16)
13. (a) Explain in detail, the operation of QPSK transmitter and receiver. (16)

OR

- (b) Write short notes on carrier and symbol synchronization. (16)
14. (a) Consider a binary linear block code with encoding matrix

$$G = \begin{bmatrix} 0 & 1 & 1 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$$

- (i) Find the parity check matrix. (3)
(ii) Construct a standard array. (5)
(iii) Determine how many errors this code can detect and correct. (4)
(iv) Draw the encoder and syndrome computation circuit. (4)

OR

- (b) (i) Explain the maximum likelihood decoding of convolutional code. (8)
(ii) Explain about turbo encoder with block diagram. (8)
15. (a) With a neat block diagrams, explain the direct sequence spread spectrum system that employs a coherent binary phase shift keying. Give BER expression. (16)

OR

- (b) Discuss the salient features of frequency hop spread spectrum systems. Also explain the generation and detection of frequency hopped signals with relevant diagrams. (16)