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Question Paper Code : 51222

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

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. What is meant by slope-over load distortion in a DM system? How can it be avoided?
2. What is companding? Write equation for A-law companding.
3. What is a matched filter?
4. State Nyquist pulse shape criterion for distortionless baseband binary transmission.
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. What is cyclic code?
8. What is meant by constraint length in convolutional code?
9. What are the advantages of spread spectrum communication?
10. Define the term 'processing gain' of a direct sequence spread spectrum system.

PART B — (5 × 16 = 80 marks)

11. (a) With the help of block schematic diagrams of the transmitter and the receiver, explain the working of binary PCM system.

Or

- (b) Explain the working of an adaptive delta modulation system with the help of block diagrams of the transmitter and the receiver.

12. (a) Draw the block diagram of band limited communication system with duobinary encoded source and explain with necessary derivation.

Or

- (b) Explain the implementation of the M-ary waveform receiver using matched filter with neat block diagram and derive an expression for error probability.

13. (a) (i) Draw the block diagram of coherent QPSK modulation technique and explain with signal space diagram. (10)
(ii) Compare the performance of binary ASK, PSK and FSK systems. (6)

Or

- (b) With the help of block schematic diagram, explain the operation of a coherent binary PSK receiver and derive its bit error probability.

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 maximum likelihood decoding of convolutional code. (8)
(ii) Explain about turbo encoder with block diagram. (8)

15. (a) Explain the working of a binary PSK direct sequence spread spectrum transmitted and receiver with neat block diagrams.

Or

- (b) (i) What are PN sequences? Discuss their characteristics and explain how PN sequences are generated with an example. (8)
(ii) Explain the principle of frequency hopped spread spectrum system. (8)