Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 41269

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

Sixth Semester

Electronics and Communication Engineering

080290039 — DIGITAL COMMUNICATION

(Regulation 2008)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State bandpass sampling theorem.

2. What are the two types of quantization errors in delta modulation systems?

3. State and prove Nyquist pulse shape criterion for zero ISI.

4. What is meant by correlative coding?

5. What is meant by matched filter?

6. Draw the signal constellation diagram for coherent QPSK system.

7. Define linear block code.

8. What is meant by constraint length of a convolutional code?

9. What is frequency-hop spread spectrum?

10. Define processing gain and jamming margin.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Draw the block diagram of PCM system and explain its function.   (10)

    (ii) Explain what is meant by uniform and non-form quantization.   (6)

Or

(b) (i) Draw the block diagram of transmitter and receivers for adaptive delta modulation system and explain. (10)

(ii) Draw the block diagram of TDM system and explain. (6)

12. (a) (i) Draw the block diagram of baseband binary data transmission system and explain. (10)

(ii) Draw the response for different roll-off factors in raised cosine spectrum and explain. (6)

Or

(b) (i) Draw the block diagram of duo binary signaling scheme without and with precoder and explain. (9)

(ii) Explain adaptive equalization with block diagram. (7)

13. (a) (i) What is correlation receiver? Explain. (4)

(ii) Draw the block diagram of a matched filter receiver for binary ASK system and derive the expression for probability of error. (12)

Or

(b) (i) Explain the properties of matched filter. (4)

(ii) Draw the block diagram of coherent quadrature modulation techniques and explain with signal space diagram. (12)

14. (a) Consider a linear block code with generator matrix.

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

(i) Determine the parity check matrix.

(ii) Determine the error detecting and capability of the code.

(iii) Draw the encoder and syndrome calculation circuits.

(iv) Calculate the syndrome for the received vector r = [1 1 0 1 0 1 0]. $(2 + 4 + 6 + 4)$

Or

(b) (i) The generator polynomial of a (7, 4) cyclic code is $1 + X + X^3$. Develop encoder and syndrome calculator for this code. (8)

(ii) Explain Viterbi decoding algorithm for convolutional code. (8)

15. (a) Explain direct sequence spread spectrum system with block diagram and derive expression for processing gain.

Or

(b) (i) Explain frequency hopping spread spectrum system with block diagram. (12)

(ii) How many runs of three zeros would be expected in a $2^{14} - 1$ chip PN sequences? (4)