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Question Paper Code : 41215

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

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 pulse amplitude modulation?
2. What is the main difference between DPCM and DM?
3. What is a matched filter?
4. State Nyquist pulse shape criterion for distortionless baseband binary transmission.
5. State the different types of pass band modulation.
6. Draw the signal space representation of MSK signal.
7. What is cyclic codes?
8. Define constraint length and code rate of a convolution code.
9. What is meant by direct sequence?
10. Define "processing gain of a code".

PART B — (5 × 16 = 80 marks)

11. (a) With the help of neat block diagram, explain the transmitter and receiver of pulse code modulation. (16)

Or

- (b) Describe the operation of delta modulation. Also state the advantages of the disadvantages of DM. (16)

12. (a) Give a complete detailed overview of noise effects on base band transmission and the remedial measures employed for it. Draw relevant diagrams.

Or

- (b) Explain the following :
- (i) Adaptive equalisation techniques. (10)
- (ii) M-ary PAM base band transmission. (6)
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) (i) Consider a linear block code with generator matrix in systematic

form as $G = \begin{bmatrix} 1 & 1 & 0 & 1 & 0 & 0 & 0 \\ 0 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 1 & 0 \\ 1 & 0 & 1 & 0 & 0 & 0 & 1 \end{bmatrix}$. (2+2+4+2)

- (1) Determine the parity check matrix in systematic form.
- (2) Determine the minimum distance of the code.
- (3) Draw the encoder and syndrome calculation circuits.
- (4) Calculate the syndrome for the received vector $r = [1 \ 1 \ 0 \ 0 \ 0 \ 1 \ 1]$.
- (ii) Explain Viterbi decoding algorithm for convolution code. (6)

Or

- (b) (i) The generator polynomial of a (7, 4) cyclic code is $g(X) = 1 + X + X^3$
- (1) Find parity check polynomial
- (2) Find the generator and parity check matrix in systematic form.
- (3) Draw the encoder and syndrome computation circuit. (2+6+4)
- (ii) Discuss trellis coded modulation in brief. (4)

15. (a) Explain the following :

(i) Slow frequency hop spread spectrum. (8)

(ii) Pseudo noise sequence. (8)

Or

(b) Draw the block diagram of direct sequence BPSK receiver and derive the expression for signal to noise ratio. (16)
