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Question Paper Code : 21452

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

Fifth Semester

Electronics and Communication Engineering

EC 2301/EC 51 — DIGITAL COMMUNICATION

(Regulations 2008)

(Common to PTEC 2301 — Digital Communication for B.E. (Part-Time) Fourth Semester — Electronics and Communication Engineering — Regulations 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State any four techniques to improve the BER of a communication system.
2. Define basis set.
3. State Nyquist sampling theorem.
4. Why is quantisation needed in coding the samples?
5. Define constraint length of a convolutional code.
6. State any two requirements of line codes.
7. State the purpose of a matched filter.
8. Why is synchronisation necessary in a digital communication system?
9. Draw PSK and QPSK waveforms for the bit stream 01101100.
10. What are coherent and non-coherent receivers?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain Gram-Schmidt orthogonalisation procedure. (12)
(ii) State and explain the dimensionality theorem. (4)

Or

- (b) (i) Explain the mathematical models of any three communication channels. (8)
(ii) Define the terms : (8)
(1) Half-power bandwidth
(2) Noise-equivalent bandwidth
(3) Absolute bandwidth
(4) Bounded power spectral density.

12. (a) Explain the sub-band coding and linear predictor coding.

Or

- (b) (i) Explain the PCM and derive the SNR expression. (8)
(ii) Explain the DM and derive the expression for quantisation noise. (8)

13. (a) Explain the Viterbi algorithm assuming a suitable convolutional coder.

Or

- (b) Derive the power spectral density for the following line coding schemes :
(i) Bipolar NRZ
(ii) Manchester NRZ

14. (a) (i) Explain the bit synchronisation. (10)
(ii) Write notes on eye diagram. (6)

Or

- (b) Discuss Nyquist solutions to eliminate ISI.

15. (a) Derive the expressions for bit error probability of the following receivers :
(i) Coherent ASK (8)
(ii) Non-coherent FSK (8)

Or

- (b) Derive the expressions for the bit error probability of the following receivers :
(i) QPSK (8)
(ii) Coherent PSK (8)