Reg. No. : | | | | | | | | | | | | |

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 sqlutions 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)