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

Question Paper Code : 80447

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

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. Draw a typical digital communication system.

2. How can BER of a system be improved?

3. State Nyquist sampling theorem.

4. Why is quantisation needed in coding the samples?

5. What is line coding?

6. Define code rate of a block code.

7. A 64 kbps binary PCM polar NRZ signal is passed through a communication system with a raised-cosine filter with roll-off factor 0.25. Find the bandwidth of the filtered PCM signal.

8. State any two applications of eye pattern.

9. Mention the drawbacks of amplitude shift keying.

10. What are coherent systems?

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) Describe temporal and spectral waveform encoding methods. (16)

Or

(b) Explain the process of quantization and obtain an expression for signal to quantization ratio in the case of a uniform quantizer. (16)

13. (a) (i) Explain the error detecting and correcting capabilities of Linear block code. (6)

(ii) Consider a (7, 4) linear block code whose parity check matrix is given by $H = \begin{bmatrix} 1 & 1 & 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 1 & 0 & 1 & 1 & 0 & 0 & 1 \end{bmatrix}$.

(1) Find the generator matrix.

(2) How many errors this code can detect?

(3) How many errors can this code be correct?

(4) Draw circuit for encoder and syndrome computation. (2 + 2 + 2 + 4)

Or

(b) (i) Explain the transform domain approach analysis of convolutional code. (6)

(ii) Derive the power spectral density of polar signaling and explain. (10)

14. (a) (i) Explain the bit synchronisation. (10)

(ii) Write notes on eye diagram. (6)

Or

(b) Discuss Nyquist solutions to eliminate ISI. (16)

15. (a) Discuss the representation and spectral characteristics of ASK, PSK, QAM, QPSK and FSK signals. (16)

Or

(b) Compare the performance of various coherent and non-coherent digital detection systems. (16)

———————