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

Question Paper Code : 51452

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2016

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. An analog waveform with maximum frequency content of 3 kHz is to be transmitted over an M-ary PCM system, where M = 16. What is the minimum number of bits/sample that should be used in digitizing the analog waveform ? (The quantisation error is specified not to exceed ± 1% of the peak-to-peak analog signal)

4. Differentiate the principles of temporal waveform coding and model-based coding.

5. Define Hamming distance and Hamming weight.

6. Define constraint length of a convolutional coder.

7. Mention two properties of matched filter.

8. What is the use of eye pattern ?

9. What are the drawbacks of binary PSK system ?

10. What is meant by coherent and non-coherent detection ?

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.

(ii) Define the terms :

(1) Half-power bandwidth

(2) Noise-equivalent bandwidth

(3) Absolute bandwidth

(4) Bounded power spectral density.

12. (a) Explain a DPCM system. Derive the expression for slope overload noise of the system. Show that SNR of DPCM is better than that of PCM.

OR

(b) (i) Explain subband coding. **(8)**

(ii) Compare the performance of various speech encoding methods. **(8)**

13. (a) Describe the steps involved in the generation of linear block codes. Define and explain the properties of syndrome. **(16)**

OR

(b) (i) Explain how convolutional codes can be generated. Illustrate with an example. **(8)**

(ii) For a convolutional encoder of constraint length 3 and rate 1/2, obtain the encoded output for the input message 10011. **(8)**

14. (a) Derive the bit error probability of a matched filter.

OR

(b) Explain the Nyquist first criterion for IS1 elimination.

15. (a) (i) Derive the power spectral density of binary ASK signal. **(6)**

(ii) Draw the block diagram of QPSK transmitter and receiver. Explain the function of various block. **(10)**

OR

(b) (i) Draw the functional block diagram of modulator for QAM and explain its operation. **(8)**

(ii) Derive the expression for error-probability of QAM system. **(8)**

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