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Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Sixth Semester

Branch : Electronics and Communication Engineering

EC 010 601—DIGITAL COMMUNICATION TECHNIQUES (EC)

(New Scheme—2010 Admission onwards)

[Regular/Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *question.*
Each question carries 3 *marks.*

1. Consider the random process $x(t) = A \sin(w_0 t + \theta)$, where θ is uniformly distributed in the interval $[-\pi, \pi]$. Verify whether $x(t)$ is wide senses stationary [WSS].
2. With a neat block diagram, explain a digital communication system.
3. A binary PAM wave is required to be transmitted via a channel having bandwidth 75 kHz. The bit duration is 10 μsec. Find a raised cosine spectrum that satisfies these requirements.
4. Write a short note on eye pattern.
5. What is trellis coded modulation ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Give the steps for finding the basis functions using orthogonalization procedure for N = 2.
7. What are the properties of matched filter ?
8. What is the necessity for non-uniform quantization ? Explain μ-law and A-law companding.
9. Describe Nyquist's criteria for distortionless base band transmission and mention its practical limitation.
10. Explain and draw the signal constellation for M-ary QAM for M = 16.

(5 × 5 = 25 marks)

Turn over

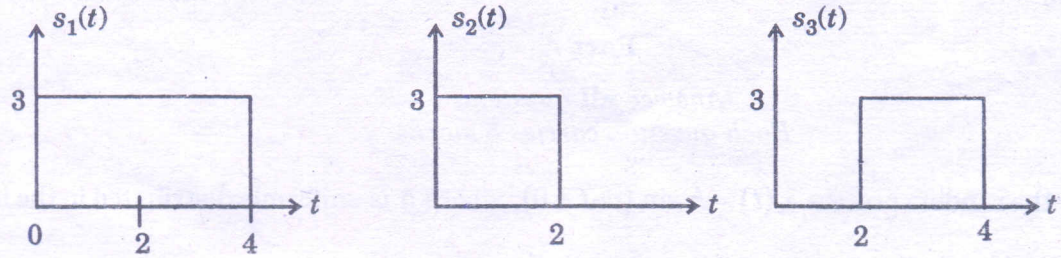
Part C

Answer **all** *questions.*
Each full question carries 12 *marks.*

11. Prove that mean square error of reconstructed message process is zero for wide senses stationary message process whose power spectral density is strictly bandlimited.

Or

12. Apply Gram Schmidth orthogonalisation to obtain orthonormal basis functions for the signals shown. Express the signals in terms of orthonormal basis functions.



13. Explain matched filter receiver and derive the expression for signal to noise ratio for a matched filter receiver.

Or

14. Define MAP criteria in a receiver and explain how ML criterion is used in correlation receiver.

15. With diagrams, explain in detail the operation of a DPCM transmitter and receiver.

Or

16. Obtain an expression for Fourier transform of a sampled signal. Assume flat top sampling. State and prove sampling and reconstruction of low-pass signals using Nyquist criterion.

17. What is correlative coding ? Explain duobinary coding with and without precoding.

Or

18. Define Inter symbol interference and explain ideal solution for zero ISI.

19. Derive an expression for probability of error in binary FSK generation and coherent detection.

Or

20. (a) Calculate the bandwidth efficiency of M-ary signaling scheme. (6 marks)

    (b) Explain with neat block diagram, the coherent QPSK transmitter and receiver. For the given binary sequence of 01101000, draw the signal space representation and relevant QPSK wave forms.

(6 marks)

[5 × 12 = 60 marks]