G 1403 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Sixth Semester

Branch : Electronics and Communication Engineering

EC 010 601—DIGITAL COMMUNICATION TECHNIQUES (EC)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

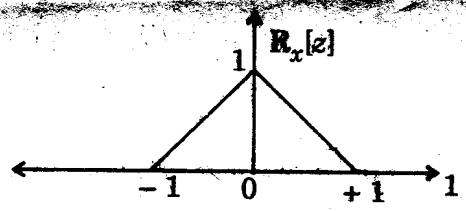
Time : Three Hours Maximum : 100 Marks

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. An auto correlation function of a wide sense stationary process X (t) is shown below. Find the power spectral density $S_x(f)$ of the random process X (t).



2. What are the main three properties of the matched filter receiver ?
3. A computer outputs binary data at the rate of 50 kbps that is transmitted using a baseband binary PAM system, which is designed to have a raised cosine pulse spectrum. Find the transmission bandwidth required for a roll-off factor of $\alpha = 0.8$.
4. How the eye diagram is formed using CRO ?
5. Write a short note on M-ary system.

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Write Gram Schimdt procedure steps for finding the orthonormal basis functions for N = 2.
7. Describe the working of a non-coherent receiver.

Turn over

8. Describe the working of a DPCM transmitter and receiver.

9. Sketch NRZ-bipolar, RZ-unipolar, Manchester and Differential Manchester line codes for the bit stream 011011.

10. Describe coherent MSK system with necessary diagrams.

(5 × 5 = 25 marks)

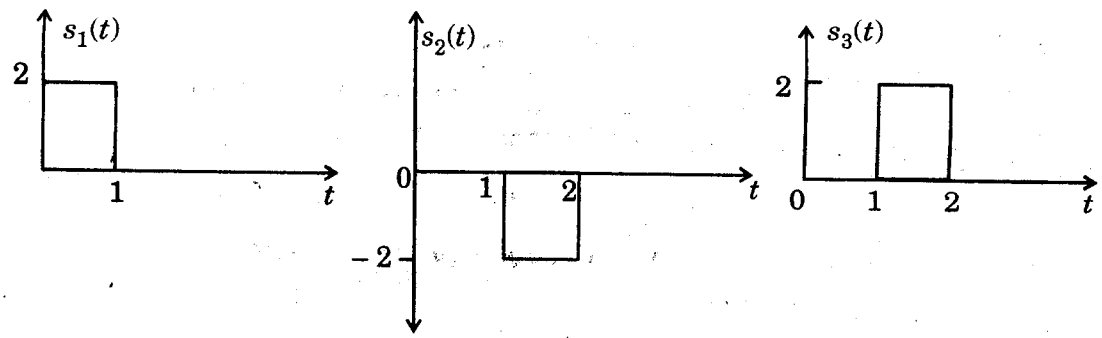
Part C

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

11. Explain auto-correlation and power spectral density of a stationary random process along with its properties.

Or

12. Apply Gram Schmidt orthogonalisation to obtain ortho normal basis functions for the signals shown below. Express the signals in terms of ortho normal basis functions.



13. How the known signals can be detected in noise using an ML-receiver ?

Or

14. Derive the expression for probability of error calculation in a matched filter receiver.

15. Explain sampling procedure mathematically along with derivation of interpolation formula.

Or

16. Explain PCM and derive the SNRo of PCM system.

17. Explain the practical Nyquist's solution for controlled ISI and write short note on Nyquist filter and Nyquist pulse shaping function.

Or

18. Explain carrier synchronization and symbol synchronization technique.

19. Explain MPSK waveform generator and MPSK receiver.

Or

20. Explain generation and detection of BFSK.

(5 × 12 = 60 marks)