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

Question Paper Code : Z 7201

M.E. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

First Semester

Applied Electronics

AN 1601 — ADVANCED DIGITAL SIGNAL PROCESSING

(Common to M.E. Communication Systems, M.E. Digital Communication and Network Engineering and M.E. Computer and Communication)

(Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State two properties of autocorrelation.
2. State spectral factorization theorem.
3. What is bias?
4. What is consistency?
5. What is an inverse filter?
6. State an application of whitening filter.
7. State the principle of steepest descent method.
8. State the principle of RLS adaptive filter.
9. What is meant by subband coding?
10. Define wavelet transform.

PART B — (5 × 16 = 80 marks)

11. (a) State and prove Wiener Khinchine theorem.

Or

(b) For the autocorrelation sequence of an MA(1) process

$Rx(k) = 17\delta(k) + 4\delta(k-1) + 4\delta(k+1)$

(i) Find the power spectrum. (12)

(ii) Find an FIR filter which can generate $x(n)$. (4)

12. (a) Obtain the periodogram for the sequence

$x(n) = (0.3, 0.1, 0.15, 0.23, 0.29, 0.28)$

Or

(b) Explain Blackman-Tukey method and discuss the bias and consistency of the estimate.

13. (a) Derive Wiener Hopf equations and the minimum mean squared error.

Or

(b) Explain any one application of Wiener filtering.

14. (a) Discuss LMS algorithm.

Or

(b) Explain adaptive noise cancellation and adaptive channel equalization.

15. (a) Discuss sampling rate conversion by a rational factor.

Or

(b) Discuss polyphase filter implementation.

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