

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – III • EXAMINATION – WINTER • 2014****Subject code: 730405****Date: 27-11-2014****Subject Name: Adaptive Signal Processing****Time: 02:30 pm - 05:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

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|------------|---|-----------|
| Q.1 | (a) Explain the factors to the choice of adaptive filtering algorithm | 07 |
| | (b) State and derive the principal of orthogonality. | 07 |
| Q.2 | (a) Explain two different approaches to the development of linear adaptive filters. | 07 |
| | (b) Explain ARMA model. | 07 |
| | OR | |
| | (b) Define correlation matrix and prove any two properties of correlation matrix | 07 |
| Q.3 | (a) Derive Winner-hopf equation for a filtering problem | 07 |
| | (b) Derive mean square error in canonical form for Winner filter | 07 |
| | OR | |
| Q.3 | (a) State and derive the principle of WOLD decomposition. | 07 |
| | (b) Explain and derive Levinson-Durbin algorithm for linear prediction | 07 |
| Q.4 | (a) State and Explain any two properties of prediction error filters. | 07 |
| | (b) Explain the all-pole, all-pass lattice structure for linear predictors. | 07 |
| | OR | |
| Q.4 | (a) Explain backward linear prediction | 07 |
| Q.4 | (b) Show the Misadjustment parameter for LMS filter is $M = (\mu / 2) * \text{tr}[R]$ | 07 |
| Q.5 | (a) Explain LMS algorithm in brief. Compare the LMS algorithm with the Steepest descent algorithm | 07 |
| | (b) Explain RLS algorithm | 07 |
| | OR | |
| Q.5 | (a) Describe three different assumptions for development of statistical LMS theory. | 07 |
| | (b) Explain NLMS algorithm | 07 |
