

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – III • EXAMINATION – WINTER 2012

Subject code: 730405**Date: 26/12/2012****Subject Name: Major Elective IV – Adaptive Signal Processing****Time: 10.30 am – 01.00 pm****Total Marks: 70****Instructions:**

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

- Q.1** (a) Explain three basic information-processing operations and Linear optimum filters. Also Compare optimum filter with adaptive filter. **07**
(b) What is discrete time stochastic process and explain wide-sense stationary process and prove that wide-sense stationary process is non-singular. **07**
- Q.2** (a) State and derive the principal of Wold Decomposition. **07**
(b) Explain Autoregressive-Moving-Average Models. **07**
- OR**
- (b) Define power spectral density and prove that power spectral density of a stationary discrete time stochastic process is real. **07**
- Q.3** (a) Derive Winner-hopf equation for a filtering problem. **07**
(b) Discuss the application of Levinson-Durbin algorithm for linear prediction **07**
- OR**
- Q.3** (a) State and describe the mathematical formulation of the steepest-descent algorithm for Wiener filter. **07**
(b) Explain and derive relations between Backward and Forward Predictors. **07**
- Q.4** (a) Derive the Misadjustment parameter for LMS filter. **07**
(b) Explain and derive the any two properties of prediction-error filters. **07**
- OR**
- Q.4** (a) Explain backward liner prediction **07**
Q.4 (b) Derive the necessary and sufficient condition for stability of steepest-descent algorithm. **07**
- Q.5** (a) Compare the LMS algorithm with the RLS Algorithm. **07**
(b) Explain NLMS algorithm **07**
- OR**
- Q.5** (a) Explain Instantaneous Frequency Measurement with the help of LMS Algorithm. **07**
(b) Explain the exponentially weighted Recursive Least-Squares Algorithms. **07**
