

**B.Tech. – VIEP – ELECTRICAL ENGINEERING  
(BTELVI)****Term-End Examination****December, 2015****BIEEE-015 : STOCHASTIC CONTROL SYSTEMS***Time : 3 hours**Maximum Marks : 70*

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*Note : Attempt any **five** questions. Each question carries equal marks.*

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1. Write short notes on any *two* of the following :  $2 \times 7 = 14$ 
  - (a) Statistical Distribution
  - (b) Gaussian Distribution
  - (c) Optimal Prediction
  
2. (a) Explain the Gauss-Markov supreme model in detail. 7
  - (b) Describe the Wiener processes used in stochastic control systems. 7
  
3. (a) Explain optimal filtering for discrete linear systems. 7
  - (b) Elaborate the errors occurring in optimal filtering. 7

4. Prove that :

$$\lambda(t/t_1) = -P^{-1}(t) [\hat{\mathbf{x}}(t/t_1) - \hat{\mathbf{x}}(t)]$$

is a solution to the fixed internal smoothing equation. Also derive the smoothing error variance equation. 14

5. (a) Classify the smoothed estimates for discrete linear systems. 7

(b) Explain the optimal fixed point smoothing. 7

6. Discuss LQG/LQR filtering problems in the context of discrete stochastic linear systems. 14

7. (a) Explain in detail the stochastic optimal control for continuous linear system. 7

(b) Describe the separation principle in optimal control systems. 7