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BIEEE-015

B.Tech. – VIEP – ELECTRICAL ENGINEERING (BTELVI)

00966 **Term-End Examination**

June, 2016

BIEEE-015 : STOCHASTIC CONTROL SYSTEMS

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. Each question carries equal marks. Use of scientific calculator is allowed.*

1. (a) What is Statistical Gaussian Distribution ? Describe the Gauss-Markov process model with detailed explanations. 7

   (b) What do you mean by Wiener process ? Explain about the Wiener filters in detail. 7

2. Explain the basic principle of Kalman filtering with a suitable block diagram. Describe one methodology to design a Kalman filter. 7+7

3. What do you mean by optimal estimation of discrete systems ? Discuss the optimal filtering for discrete linear systems in detail. 5+9

4. Explain optimal smoothing for a discrete linear system. Classify the different smoothed estimates with proper explanations. 7+7

5. Discuss the difference between optimal fixed point smoothing and optimal fixed-lag smoothing. Write the advantages and disadvantages. 7+7

6. (a) What are LQR problems ? For a system $\dot{X} = AX + BU$, formulate an LQR problem. (Take necessary assumptions.) 7

   (b) What is the separation principle in stochastic linear problem ? Explain its significance. 7

7. Write short notes on any ***two*** of the following : $2 \times 7 = 14$

   (a) Embedded Markov chain

   (b) Single stage optimal smoothing

   (c) Stochastic optimal control
