| BIEEE-015 |

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

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June, 2018

BIEEE-015 : STOCHASTIC CONTROL SYSTEMS

Time : 3 hours   *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Symbols used have their usual meanings.*

1. (a) Define the expected value of Discrete Random Variable and Continuous Random Variable.   7

   (b) Consider a random process X(t). X(t) = ξ cos(ωt) = f(ξ, t) where ω is constant, ξ is a random variable uniformly distributed in interval [– 1, 1].   7

2. Explain the Gauss–Markov sequence model in detail.   14

3. (a) What is the concept of optimal smoothing for discrete linear systems ?   7

   (b) Explain the different types of smoothing techniques which are optimal in nature.   7

4. (a) Differentiate between "white noise" and "coloured noise". *4*

(b) Discuss the role of white noise in modelling stochastic systems. *10*

5. Show that the output of a fixed lag smoother driven from a Kalman filter with the smoother states instantaneously reset to zero (or some arbitrary values) at $k = j$ yield the correct fixed lag estimates for $k \geq j + N$. *14*

6. Enumerate the different methods used for stochastic optimal control in discrete linear system. *14*

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

(a) Important Characteristics of Wiener Filter

(b) Linear Quadratic Gauss Problem

(c) Random Processes