6. (a) Define discrete-time Kalman filtering problem and its solution. **6**

(b) What are different applications of Kalman Filter ? Explain, how identification problem can be solved by using Kalman filtering. **9**

Unit IV

7. Explain the methods of least square parameter estimation for static process. **15**

8. (a) How can the method of least squares be interpreted geometrically ? **8**

(b) Give brief explanation about maximum likelihood in context of parameter estimation for static processes. **7**

No. of Printed Pages : 04 **Roll No. .....**

18BB1052

M.Tech. EXAMINATION, May 2019

(Second Semester)

(C Scheme) (Main Only)

EE(I&C)

MIC504C

STOCHASTIC FILTERING AND IDENTIFICATION

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit.

Unit I

1. (a) Describe conditional distribution of a random variable. Determine the conditional distribution F(x|M) of random variable $x(f_i) = 10i$ of fair die experiment, where M = $\{f_2, f_4, f_6\}$ is the event "even". **7**

(b) Prove and explain total probability theorem and Bayes theorem for a random variable. **8**

2. (a) Define random variable and also explain the concept of random variable with help of suitable example. **3**

(b) What do you mean by distribution function of random variable ? A fair coin is tossed twice and let the random variable x represent the number of tails. Find $F_x(x)$. Also discuss the properties of distribution functions of random variable. **12**

Unit II

3. (a) What do you mean by bivariate distributions ? Describe joint distribution and density of two random variables. Also explain the properties of joint distribution function. **10**

(b) Give brief explanation of the following terms associated with function of two random variables :

Joint density, Joint statistics and Marginal statistics. **5**

4. Explain fundamental theorem in concern of random variables which are functions of random variable(s). **15**

Unit III

5. Discuss in detail about the following in concern of Gauss-Markov Discrete-Time Model : **15**

(a) System Description

(b) Noise Description

(c) Initial State Description