**Registration No:** | | | | | | | | | | |

**Total Number of Pages: 01**



**M.TECH**
**P2SCBC01**

**2nd Semester Regular Examination 2016-17**
**Detection & Estimation Theory**
**BRANCH:SIGNAL PROCESSING AND COMMUNICATION**
**Time: 3 Hours**
**Max Marks: 100**
**Q.CODE:Z358**

**Answer Question No.1 which is compulsory and any FOUR from the rest.**
**The figures in the right hand margin indicate marks.**

**Q1** Answer the following questions: **(2 x 10)**

**a)** What are the fundamentals requirements for estimation of a signal?
**b)** What do you understand by Hypothesis Testing?
**c)** What is Bay's Rule? Express.
**d)** State theNeyman-Pearson Theorem
**e)** What does GLRT stands for? Where is it used?
**f)** What is the role of a biased estimator in finding out Minimum Variance Criteria?
**g)** When can an Estimator be said to be efficient?
**h)** What is MAP?
**i)** Find out the optimality of MLE for linear Model
**j)** Describe the inverse property of MLE.

**Q2** **a)** Describe Min-Max Hypothesis testing with proper equations and represent them using neat graphical sketch **(10)**
**b)** What is CRLB? Mention its theorem and various conditions. **(10)**

**Q3** **a)** What is an Un-biased Estimator? Describe how to check whether a given estimator is biased or unbiased. Explain giving proper examples. **(10)**
**b)** **(i)** Describe the Extension of MVUE citing proper examples. **(5)**
**(ii)** Write down about MAP Detection and MI Detector. **(5)**

**Q4** **a)** What is KalmanFilter? Explain its role in Signal Estimation with proper examples. **(10)**
**b)** **(i)** State RBLS theorem. **(5)**
**(ii)** Describe the asymptotic properties of MLE for Vector Parameter. **(5)**

**Q5** **a)** What is Wiener prediction? Write down the relevant equations **(10)**
**b)** What is BayesianPhilosophy? Describe its various errors with neat graphical sketch and expressions. **(10)**

**Q6** **a)** What is Recursive Least Square Approach? Explain using its problem statements. **(10)**
**b)** **(i)** Explain the optimality of MLE for Liner Model. **(5)**
**(ii)** Discuss the Minimum Mean Square Estimator with the derived equations. **(5)**

**Q7** Elaborate on **any two** of the following **(10X2)**

**a)** Wiener Filter
**b)** BLUE
**c)** MLE and its properties.
**d)** Gauss-Markov process