

<b>R09</b>
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Code No: C3805, C7005

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech I - Semester Examinations, March/April-2011

DETECTION AND ESTIMATION THEORY

(COMMON TO DIGITAL ELECTRONICS AND COMMUNICATION SYSTEMS,  
ELECTRONICS AND COMMUNICATION)

Time: 3hours

Max. Marks: 60

**Answer any five questions**  
**All questions carry equal marks**

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1. What is Hypothesis? Discuss a simple Binary Hypothesis with a real time application of RADAR and hence discuss M-Hypothesis. [12]
2. Write short notes on
  - a) Spectral Decomposition with an application to Seismic data processing
  - b) Composite Hypothesis. [12]
3.
  - a) How matched filter is considered as an optimum filter – Justify it and derive the expression for transfer function of the same.
  - b) Discuss Neyman-Pearson criteria for radar detection. [12]
4. Discuss in detail of detection and estimation of signals affected by AWGN using Maximum likelihood estimation. [12]
5. What is the importance of Kalman filtering in estimation theory and hence give the detailed description of each block of Kalman filter with a neat block diagram. [12]
6. How Kalman-Bucy filter is differ from Kalman filter and hence discuss how it is used for online estimating or tracking of unobservable signals. [12]
7. Discuss
  - a) Multidimensional waveform estimation
  - b) Non-random waveform estimation. [12]
8. What is Cramer Rao bound and what are its limitations? Discuss how a lower bound on the mean square estimation error helps to get tighter lower bounds improving the SNR threshold prediction. [12]

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