Code No: G8205/R13

M. Tech. I Semester Supplementary Examinations, January-2017

DETECTION AND ESTIMATION THEORY

(Common to DE&CS, E&CE, CS, M&CE and DECE)

Time: 3 hours **Max. Marks: 60**

Answer any FIVE Questions
All Questions Carry Equal Marks

1. a List important properties of estimators. What do you understand by "Discrete linear model" in estimation?
   b Distinguish between Point Processes and Gaussian processes.

2. a A single observation x=s+n consists of zero mean Gaussian noise plus either $s^{(1)}=1$ (or)$s^{(2)}=2$, with the two possible signals equally likely to be present. Show that the best minimum pre decision rule says that $s^{(1)}$ is present if $x \leq 1.5$ and $s^{(2)}$ is present if $x>1.5$ Find the corresponding P_e if $\sigma_n^2 = 1$.
   b Derive the likelihood ratio test (LRT), under the Neyman Pearson (NP) criterion for a binary hypothesis problem.

3. a Discuss nonlinear minimum mean squared error estimators.
   b What are the applications of Digital Wiener Filters?

4. a What is the significance of multiple linear regression? Explain.
   b What is the significance of nonparametric estimators of probability distribution? Explain.

5. a Define wide sense stationary random process? Explain the tests for stationary.
   b Explain the power special density functions.

6. a With neat sketch explain kalman filters and its mathematical analysis.
   b Explain model-based estimation of autocorrelation functions.

7. Consider the problem of finding the linear fit to the data set $\{x_i, y_i\}$, i =1,2,….N, using the relation y = A + Bx. Find the MMSE estimates for A and B.

8. Write Short notes on
   a) Simple Linear Regression.
   b) Innovation.

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