

Subject Code: G8205/R13

M. Tech –I Semester Regular Examinations, March, 2014

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) Find the DTFT of $x[n] = \{1, -1, 2, -2, 3, -3, 4, -4\}$. Draw the amplitude and phasespectrum.
b) What is a Random Process?. Write about Markov Processes and Gaussian processes.
2. a) Derive the decision metric used in Bayes detector for the binary hypothesis testing problem.
b) What is the need of wiener filter for the estimation of Minimum Mean square Error?
3. a) Explain the operation of a matched filter? Derive an expression for its impulse response.
b) Explain about Minimum Probability of error criterion for the detection of signals in Noise with necessary derivations.
4. a) Explain the Neymen-Pearson criterion for radar detection of constant amplitude signal.
b) Explain the basic principle of matched filter in the detection of signals in additive white Gaussian noise environment.
5. a) With necessary block diagram explain the operation of Kalman filter.
b) Explain about the Kalman Predictor.
6. a) Derive the relationship between the autocorrelation and power spectral density.
b) Discuss about the non-random waveform estimation.
7. a) With necessary derivations explain about any one of the optimum detection algorithm.
b) What are the measures of quality of various estimators? Define and explain them.
8. Write a short notes on
 - a) ML estimator.
 - b) Filtering of signal in noise.
