

GANPAT UNIVERSITY
B. Tech. Semester VI (Electronics and Communication Engineering)
CBCS Regular Theory Examination April - June 2015
(2EC604) Introduction to Detection Theory

Time: 3 Hours

Total Marks: 70

Instructions:

1. All questions are compulsory.
2. Write answer of each section in separate answer books.
3. Figures to the right indicate marks of questions.
4. Standard terms and notation are used.

Section - I

- Q-1 (A)** Prove that correlation coefficient is independent of the origin and scale. [6]
- (B)** A random variable X is exponentially distributed with parameter $\lambda=1$. Use Tchebycheff's inequality to show that $P\{(-1 \leq X \leq 3) \geq 0.75\}$ also Find the actual probability. [6]

OR

- Q-1 (A)** Compute correlation coefficient (r_{xy}) between X and Y . [6]

X	80	45	55	56	58	60	65	68	70	75	85
Y	82	56	50	48	60	62	64	65	70	74	90

- (B)** Prove Tchebycheff's inequality. [6]

- Q-2 (A)** Explain Strict sense stationary (SSS) and wide sense stationary (WSS) Processes. [6]
- (B)** Prove that output of the Matched filter depends on the energy rather than shape of the input signal. [5]

OR

- Q-2 (A)** Show that Match filter is an alternate option of the correlation type demodulator. [6]
- (B)** Justify that SNR can be improved by "Wiener-hopf filter" [5]
- Q-3 (A)** Explain binary Maximum Likelihood detection. [6]
- (B)** Find the orthogonal basis signals using Gram-Schmidt procedure. [6]

