

Probability and statistics – scope for exam in 2016 for Electronics and Telecommunication in English

1. Application of statistical methods - Uncertainty in the experimental measurements

Simple and complex measurands; uncertainty and error, absolute and relative uncertainty, measures of uncertainty: standard and maximum; classification of errors (random vs. systematic), distribution of random and systematic errors, analysis of uncertainties (type A and B), propagation of errors, total differential and law of propagation of uncertainties (examples), rules of data plotting

2. Introduction

Historical background; the concept of probability; the paradox of the Chevalier de Méré; the role of probability and statistics in science and engineering; type of statistical data and their graphical representation (histogram, Sturge rule).

3. Probability

Sample spaces and events; definitions and interpretation of probability (classical, geometric-Bertrand paradox, frequency, axiomatic), elements of combinatorics (permutations, combinations), conditional probability; independence; Bayes' theorem; random variables; advanced problems concerning probability.

4. Discrete random variables and probability distributions

Probability mass function; cumulative distribution function, CDF (examples); mean and variance of a discrete random variable; quantiles, median, mode, range, discrete uniform distribution; binomial distribution; Poisson distribution.

5. Continuous random variables and probability distributions

Probability density function; Gauss and normal distribution; calculations of mean and variance of distributions of continuous random variables; examples of integration.