Ph.D. Preliminary Qualifying Examination

Syllabus - Paper I: Research Methodology in Electronics

1. Introduction to Research Methodology: Objectives of research, Motivation, Types of research, Research approaches, Significance of research, Research methods versus methodology, Research and scientific methods, Defining the research problem, Selecting the research problem, Necessity of defining problems, Techniques involved in defining a problem, Need for Research design, Concepts & different research design, Exploratory, Descriptive, Diagnostic Research, Basic Principles of experimental designs, Design of Experiments.

   Text Book: C. R. Kothari, Research Methodology: methods and techniques, Second revised edition, New age international publication, 2004. (Unit 1 and 3)

2. Sampling & Data Collection: Sampling design steps and types of sampling design, Measurement & scaling of data, Types of Data, Methods and Techniques of Data Collection, Primary & secondary data used in data collection. Static and dynamic characteristics of instruments used in the experimental set up, calibration of various instruments, sampling methods, methods of data collection, Selection of Appropriate Method for Data Collection, Data collection using a digital computer system, case studies of data collection.

   Text Book: C. R. Kothari, Research Methodology: methods and techniques, Second revised edition, New age international publication, 2004. (Unit 4 and 6)

3. Data reduction and error analysis: The presentation of physical quantities with their inaccuracies, Significant figures, Errors: Classification and propagation, probability distributions, Processing of experimental data, Graphical handling of data with errors, Fitting functions to data.


   Text Book: K. N. Krishnaswamy, Appa Iyer Sivakumar, M. Mathirangan, Management Research Methodology: Integration of Principles, Methods and Techniques, Pearson Education New Delhi, 2006 (Unit 9)