Preface to the Third Edition

The tremendous and overwhelming response received to the second edition of this book has inspired me to bring out the third edition. This new edition has been revised and updated based on the suggestions received from the students and teachers using this book.

The book is written in a simple and lucid manner with systematically arranged chapters to enable the reader to get thorough knowledge, starting from the basic concepts to the sophisticated advancements of all types of measuring instruments and measurement techniques.

With the advancement of technology in integrated circuits, instruments are becoming increasingly compact and accurate. In view of this, sophisticated types of instruments covering digital and microprocessor-based instruments are dealt with in detail, in a systematic manner for easy understanding. The basic concepts, working operation, capabilities and limitations of the instruments discussed in the book will also guide the users in selecting the right instrument for different application.

New to this Edition

- ❖ Inclusion of new topics on Telemetry, Electric and Voltage Standards and Rotational Variable Differential Transducers (RVDT)
- ❖ Expanded coverage of Bridges which now includes Maxwell Wien Bridge, Anderson Bridge, Carey Foster Bridge, De Sauty Bridge and Owen Bridge
- ❖ Thoroughly revised pedagogy including
  - ☞ 300 Review questions
  - ☞ 200 Objective type questions
  - ☞ 125 Solved examples and practice questions
  - ☞ Easy steps introduced for solved examples

Chapter Organisation

Chapter 1 covers the basic characteristics and the errors associated with instruments. Different types of indicating and display devices are dealt in detail in **Chapter 2**. This chapter discusses different types of printers and printer heads used with computers.

The basic analog-type ammeters for both dc and RF frequencies and different types of voltmeters, ohmmeters to multimeters are discussed in **Chapters 3** and **4**.

Digital instruments ranging from a simple digital voltmeter to a microprocessor-based instrument and their measurement techniques are presented in a comprehensible manner for easy understanding in **Chapters 5** and **6**. **Chapter 7** on oscilloscopes has been dealt with in depth to familiarize the students with the working of all types of Cathode Ray Oscilloscopes (CROs) and their measurement techniques. **Chapter 8** pertains to signal generation. **Chapter 9** analyses the frequency component of a generated wave, and its distortion.

In industry, it is required to transmit signals or the changes in parameters from the measurement site location to the control room. Hence in **Chapter 10**, telemetry systems have been covered to get a brief insight of the various transmission methods used in industry.

Most instruments used in process control plants measure various parameters such as resistance, inductance, capacitance, dissipation factor, temperature, etc. To obtain accurate measurement of the changes in parameters, bridges are used. Hence, **Chapter 11** covers most of the types of bridges used for measurement of different parameters, for example, Wheatstone's bridge, Maxwell's Bridge, Hay's Bridge, Schering Bridge, etc. Instruments and the instrumentation systems also use bridges as the input stage.

Chapters 12, 13 and **14** cover the essential components of industrial instruments used for measurements and their usage.

Different types of analog and digital filters are given in **Chapter 15.** A mathematical approach to explaining digital filters has been adopted to provide the students a clear insight into their working. **Chapter 16** is on the measurement of microwave frequencies. A detailed discussion on the data acquisition system along with the latest data logger is covered in **Chapter 17.** Instruments from remote places transmit signals over long distances to a master control room where they are displayed. This transmission of signals has been explained in detail in **Chapter 18.**

Frequency standards and measurement of power at RF and microwave frequencies are dealt with in **Chapters 19** and **20** respectively. **Chapter 21** discusses control systems, electronic control systems in particular. This chapter covers the basic control systems, electronic control systems, electronic controllers, PLC and advanced control systems such as DCS used in process control plants.

Web Supplements

The Web Supplement can be accessed at: *http://www.mhhe.com/kalsi/ei3*, which contains the following:

For Instructors:

Solution Manual, Power Point Lecture Slides.

For Students:

Additional Review Questions, Web links for useful reference materials.

Acknowledgements

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