

PET5J006 SENSORS AND TRANSDUCERS**MODULE-I**

Elements of a general measurement system; Static Characteristics: systematic characteristics, statistical characteristics, calibration; Dynamic characteristics of measurement systems: transfer functions of typical sensing elements, step and frequency response of first and second order elements, and dynamic error in measurement systems.

MODULE-II

Sensing elements: Resistive sensing elements: potentiometers, Resistance Temperature Detector (RTD), thermistors, strain gages. Capacitive sensing elements: variable separation, area and dielectric; Inductive sensing elements: variable reluctance and LVDT displacement sensors.

MODULE-III

Signal Conditioning Elements: Deflection bridges: design of resistive and reactive bridges, push-pull configuration for improvement of linearity and sensitivity Amplifiers: Operational amplifiers-ideal and non-ideal performances, inverting, non-inverting and differential amplifiers, instrumentation amplifier, filters. A.C. carrier systems, phase sensitive demodulators and its applications in instrumentation.

MODULE-IV

Thermoelectric sensing elements: laws, thermocouple characteristics, installation problems, cold junction compensation. IC temperature sensor Elastic sensing elements: Bourdon tube, bellows, and diaphragms for pressure sensing, force and torque measurement.

Additional Module (Terminal Examination-Internal)**Electromagnetic sensing elements: velocity sensors****Text Books:**

1. Principles of Measurement Systems, J.P. Bentley, Pearson Education, New Delhi, 3rd Edition 2007.
2. Introduction to Measurement and Instrumentation, A.K. Ghosh, PHI Learning, 3rd Edition, 2009.
3. Transducers and Instrumentation, D.V.S. Murthy, PHI Learning, New Delhi, 2009.

Reference Books:

1. Measurement Systems Application and Design, E.O. Doebelin, McGraw-Hill, 4th Edition.
2. Instrumentation for Engineering Measurements, J.W. Dally, W.F. Riley and K.G. McConnel, John Wiley, NY, 2nd edition 2003.
3. Industrial Instrumentation, T.R. Padmanabhan, Springer, London, 2000.