

PCE5J001 PROCESS INSTRUMENTATION

Module I:

Basic concepts and qualities of measurement, Level measurement: Methods of liquid level measurement, Direct methods, Hook-type level indicator, sight glass, Float-type level indicator, Displacer level detectors, Indirect methods, Hydrostatic pressure type, Pressure gauge method, Air bellows, Air purge system, Liquid purge system, Electrical methods.

Module II:

Flow Measurement: Methods of flow measurement, Inferential flow measurement, Quantity flowmeters, Mass flowmeters, Calibration of flowmeters, Selection of flowmeters.

Pressure measurement: Pressure, Methods of pressure measurement, Manometers, Elastic pressure transducers, Measurement of vacuum, Force-balance pressure gauges, Electrical pressure transducers, Pressure switches, Calibration of pressure measuring instruments, Maintenance and repair of pressure measuring instruments, Troubleshooting.

Module III:

Temperature measurement: Temperature, Temperature scales, Methods of temperature measurement, Expansion temperature, Filled-system thermometers, Electrical temperature instruments. Pyrometers: Radiation and optical.

Methods of composition analysis: Absorption spectroscopy, Emission spectroscopy, Mass spectroscopy.

Text and Reference Books:

1. *Industrial Instrumentation* by D P Eckman, CBS.
2. *Instrumentation: Devices and Systems*, 2nd ed. by C Rangan, G Sarma, and V S V Mani, McGraw-Hill.
3. *Principles of Measurement Systems*, 3rd ed. by J P Bentley, PHI.
4. *Industrial Instrumentation and Control*, 3rd ed. by S K Singh, McGraw-Hill.