

PROCESS INSTRUMENTATION & CONTROL

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UNIT-1 → FUNDAMENTAL

CO-1 → To understand the fundamental of Measurement & measuring instrument.

LO-1 → Attain knowledge on different measurement methods employed in industrial processing & manufacturing.

CONTENT → ① Importance of Instrumentation & Control in plastic industries.

② Types of Measurement.

③ Measuring Instrument

④ Classification of Instruments.

Method of Assessment → Internal → Test-1

LO-2 → To gain the knowledge of different measuring instruments.

CONTENT → ⑤ Parts of the measuring instruments.

⑥ Characteristics of an Instruments.

⑦ Static & dynamics characteristics.

⑧ Functional elements of an instruments.

Method of Assessment → External.

UNIT-2 → TEMPERATURE MEASUREMENT

CO-2 → Analyze the different temperature measurement devices in plastic industries.

LO-3 → Attain knowledge on different temperature measuring instruments.

CONTENT → ① Temperature Scales.

② Classification of temperature measuring instruments.

- ③ Mercury in glass thermometer.
- ④ Filled system or Pressure spring thermometers.
- ⑤ Bimetallic Thermometer.

Method of Assessment → External

LO-4 → To gain the knowledge of thermocouples, pyrometers, etc.

CONTENT → ⑥ Thermocouples.

- ⑦ Resistance Temperature Detectors (RTD)
- ⑧ Radiation Pyrometer
- ⑨ Optical Pyrometer.

Method of Assessment → External

### UNIT-3. → PRESSURE MEASUREMENT

CO-3 → Identify the most common types of Pressure measuring instruments used in plastic industry.

LO-5 → Explain the various methods of Pressure measurement.

CONTENT → ① Pressure

- ② Pressure measuring instruments.
- ③ Barometers.
- ④ Manometers.
  - (i) U-Tube Manometers
  - (ii) Well type manometer
  - (iii) Enlarged leg manometer.
  - (iv) Inclined Leg manometers.

Method of Assessment → External

LO-6 → Recognize the construction of the different types of Elastic Pressure Transducers.

CONTENT → ⑤ Elastic Pressure Transducers.

- (i) Bourdon Pressure gauge.
- (ii) Diaphragm Pressure gauge.
- (iii) Capsule Pressure gauge.
- (iv) Bellows Pressure gauge.
- (v) Electrical Pressure Transducers.

Method of Assessment → External.

LO-7. → Recognize the construction of the different types of Force Balanced pressure gauges.

CONTENT → ⑥ Force Balanced Pressure Gauges.

- (i) Dead-Weight Piston Gauges.
- (ii) Ring balance gauge.
- (iii) Bell Gauge.

Method of Assessment → External

## UNIT-4. FLOW MEASUREMENT

CO-4. → To impart knowledge on various flow measurement devices.

LO-8. → Explain the various methods of Flow measurement.

CONTENT → ① Flow measuring methods.

② Head Flowmeters.

- (i) Flow measurement using Orifice plate.
- (ii) Flow measurement using Venturi tubes.
- (iii) Flow measurement using Pitot tubes.
- (iv) Flow measurement using Flow nozzle.

Method of Assessment → External.

LO-9 → To understand & measure fluid flow using Variable Area flowmeter & Electromagnetic flowmeter.

CONTENT → ③ Variable Area Flowmeter.

- ① Flow measurement using Rotameter
- ② Flow measurement using Valve-type Area meter.
- ④ Electromagnetic Flowmeter.

~~LO-9~~ → Method of Assessment → External.

LO-10 → Attain knowledge on Positive Displacement Flowmeters.

CONTENT → ⑤ Positive Displacement Flowmeters.

- ① Reciprocating Piston-type Flowmeter.
- ② Nutating - Disc Flowmeter.
- ③ Rotating Vane Flowmeter.
- ④ Lobbed Impeller Flowmeter.

Method of Assessment → Internal → Test - 2

## UNIT-5 → CONTROL

CO → 5 ⇒ To develop an understanding of Control system.

LO-11 → To gain the knowledge of various control processes for closed loop & open loop system.

CONTENT → Introduction to manual & automatic control, Open loop & closed loop control systems, Concept of block diagram, Servomechanism & Regulator control, Definition of load, disturbance, input variable, manipulated variable, controlled variable, set point, error.

Method of Assessment → External.

LO.-12 → Attain knowledge on various types controllers.

CONTENT → Proportional, Integral & Derivative control,

Process control & their combination,

Deviation & Overshoot,

Pneumatic, hydraulic, Electrical & Electronic controllers.

Method of Assessment → Internal → Assignment.