

# AMEC10 ELECTRICAL MEASUREMENTS

## UNIT-1 UNITS, SYSTEMS, DIMENSIONS AND STANDARDS

- 1.1 Introduction, Unit, Absolute Units, Fundamental And Derived Units,
- 1.2 Dimensions, Dimensions Of Mechanical Quantities, Cgs System Of Units, Practical Units,
- 1.3 Rationalized M.K.S.A System, Si Units, Base Units Of Si, Multiplying Prefixes Of Units,
- 1.4 Standards And Their Classification, International Standards, Standards For Mass And Length,

## UNIT-2 RESISTANCE MEASUREMENTS OF RESISTANCE.

- 2.1 The Pyrolitic or cracked –carbon resistor, Metal –film resistors, Resistors, Time constant resistors. Measurement of Resistance: Voltmeter Ammeter Method,
- 2.2 Substitution Method, Direct Deflection Method, Differential Galvanometer Method, Kohlrausch's Method, Wheatstone Bridge, Working of the bridge, Measurement of high-resistances

## UNIT-3 POTENTIOMETER

- 3.1 Analysis of Potentiometer Circuit, Limitation due to the galvanometer sensitivity, Student Type Potentiometer,
- 3.2 Use of potentiometer in the measurement of resistance , voltage and current: Resistance , Measurement of current , Measurement of high voltages

## UNIT-4 A.C.BRIDGES

- 4.1 Sources and detectors, general form of an a.c. Bridge. Measurement of self-inductance, Maxwell's inductance-capacitance bridge, hay's bridge,
- 4.2 Anderson's bridge, Owen's bridge, measurement of capacitance, measurement of mutual inductance, Heaviside mutual inductance bridge,
- 4.3 Campbell's modification of Heaviside bridge, Heaviside Campbell equal ratio bridge,

## UNIT-5 ANALOG AMMETERS, VOLTMETERS AND OHMMETERS

- 5.1 Types of instruments, errors in ammeters and voltmeters, permanent magnet moving coil instrument (pmmc), ammeter shunts, multi-range ammeters, moving iron (m.i.) Instruments,
- 5.2 General torque equation of moving iron instruments, classification of moving iron instruments, shape of scale of moving iron instruments, multipliers for moving iron instruments,
- 5.3 Comparison between attraction and repulsion types of instruments, errors in moving iron instruments, electro-dynamometer (electrodynamic) type instruments,
- 5.4 Operating principle of electro-dynamometer type instrument, construction of electro-dynamometer type, instrument, torque equation of electro-dynamometer instruments,
- 5.5 Hot wire instruments, thermocouple instruments, principle of operation of thermo-electric instruments, electrostatic instruments. , force and torque equations of electrostatic instruments.
- 5.6 Rectifier type instruments, rectifier elements, multimeters

## UNIT-6 INSTRUMENT TRANSFORMER

- 6.1 Use of instrument transformers, ratios of instrument transformers,

- 6.2 Burden of an instrument transformer, current transformers, relationships in at current transformer, errors in current transformers, potential transformers,
- 6.3 Relationships in a potential transformer, errors in potential transformers, reduction of errors in potential transformers, construction of potential transformers,
- 6.4 High voltage potential transformers, protection of potential transformers

### **UNIT-7 MEASUREMENT OF NON-ELECTRIC QUANTITIES**

- 7.1 Linear Displacement Transducers, Measurement Of Rotary Displacement, Strain Gauges And Measurement Of Strain, Ballast Circuit, Null Type Wheastone Bridge,
- 7.2 Deflection Type Wheastone Bridges, Gauge Sensitivity, Temperature Compensation, Adjacent Arm Compensating Gauge, Use Of Two Active Gauges In Adjacent Arms,
- 7.3 Use Of Our Active Gauges, Poisson's Method, Practical Strain Bridge, Strain Gauge Calibration, Uses Of Strain Gauges, Measurement Of Pressure,
- 7.4 Measurement Of Pressure Using Electrical Transducers As Secondary Transducers, Measurement Of Linear Velocity, Moving Magnet Type,
- 7.5 Measurement Of Angular Velocity, Electrical Tachometers, Electromagnetic Tachometer Generators, Digital Methods, Photoelectric Tachometer,
- 7.6 Toothed Rotor Variable Reluctance Tachometer, Measurement Of Temperature, Measurement Of Resistance Of Thermometers,
- 7.7 Salient Features of Resistance Wire Thermometers, Thermistors.

#### **Reference Book:**

- 1. Electrical Engineering, Publisher Katsons, Writer J B Gupta

