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Comprehensive Course on Electrical Measurement

Introduction of Measurements and Types of Error

Khemendra

→ JE/AE –

gate - 3- 5 Marks

ESE - 40 Marks

↳ Mains → 60 Marks - 80

PSU →

Lesson 1 • Sept 7, 2020 • Khemendra Verma

Electrical Measurement

Direct Measurement : Comparing unknown Quantity with the known Quantity

Indirect Measurement : Either the current or Voltage is converted to the mechanical deflecting system. So that by mean of pointer & Scale Reading can be taken.

Error :

600 Rpm — f_T — True value

570 Rpm — A_m — Measured value.

error = o/p - Input = 570 - 600 = -30

Static characteristic

Accuracy : closeness with an instrument Reading approaches to true value

precision : Measure of Reproducibility

Sensitivity : Ratio of change in output to change in input.

$$\text{Sensitivity} \propto \frac{\theta}{I} \propto \frac{\text{Torque}}{\text{weight}}$$ → T/W → Ratio.

Resolution :- The Small change in the input Quantity which can be detected with its certainty.

Dead Zone :- Largest change in the input Quantity for which there is No output in the instrument.

Dead time :- Time Required by measuring System to began to Respond to a change in input.

Absolute Instrument :-

These instruments give the magnitude of Quantity under measurement in terms of physical constants.

Eg → Tangent Galvanometer
→ Rayleigh Current Balance.
→

Secondary Instruments :- Calibrated on the basis of Absolute Instrument.