

Roll No. ....

Total Pages : 3

**015505**

**December 2023**

**B.Tech. (Electronics & Computer) – V SEMESTER**

**Electrical Measurement & Instrumentation  
(OEL-502)**

Time : 3 Hours]

[Maximum Marks : 75

*Instructions :*

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*
4. *Assume relevant data, if not provided.*

**PART-A**

1. (a) What type of errors can occur in Analog Ammeters? (1.5)
- (b) What is the significance of power factor in power factor meters, and how do they work? (1.5)
- (c) How can the range of analog ammeters and voltmeters be extended? (1.5)
- (d) What are the effects of temperature on the performance of analog instruments? (1.5)

015505/210/111/256

**228** [P. T. O.]

- (e) What is the working principle of Hall Effect Sensors? (1.5)
- (f) Why wheat stone bridge is still relevant in today's world? (1.5)
- (g) How you can reduce the errors in current transformers? (1.5)
- (h) What is the use of focusing anode in CRO and which potential is applied to it? (1.5)
- (i) What are uses of instrument transformers? (1.5)
- (j) Why LVDT has linear response? (1.5)

**PART-B**

- 2. Explain the construction details of Repulsion – Attraction type moving iron instrument. Derive the Torque equation for moving iron instrument. (15)
- 3. (a) A dynamometer-type watt meter has a field system which may be considered long compared with its moving coils. The flux density is 0.012T. The mean diameter of the moving coil is 5 cm and the moving coil turns are 600. The current through the coil is 0.06A and the power factor of the circuit of which the power is measured, is 0.866. Estimate the torque when the axis of the field and moving coil is 600. (10)
- (b) Define active and Reactive power. (5)
- 4. What are the various types of errors in induction type energy meter? Explain the methods incorporated for their compensation. (15)

- 5. (a) Show how the Wien's bridge can be used for the measurement of frequency in audio range. Derive the equation for frequency  $f$ . (10)
- (b) Explain the principle of Anderson bridge. (5)
- 6. (a) Explain the working of Digital Shaft Encoders. (7.5)
- (b) Which has the better accuracy among Thermistor and RTDs and why? (7.5)
- 7. Write short notes on following on any **two**:
  - (a) Working of Potential Transformer and its phasor diagram.
  - (b) Harmonic Distortion Analyzer.
  - (c) Digital Storage Oscilloscope. (15)