

Code No: RT31021

**R13****SET - 1****III B. Tech I Semester Supplementary Examinations, May -2018****ELECTRICAL MEASUREMENTS**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
2. Answering the question in **Part-A** is compulsory  
3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

- 1 a) Explain about transfer instruments. List out the features of indicating instruments. [3M]
- b) List out the errors in electrodynamicometer wattmeters. [4M]
- c) Explain the process of standardization of potentiometer. [3M]
- d) Classify sources of supply and detectors and briefly explain about each. [4M]
- e) List out the principal requirements in magnetic measurements and reasons for inaccuracies in measurement. [4M]
- f) List out the advantages and limitations of digital instruments over analog instruments. [4M]

**PART -B**

- 2 a) Explain about static calibration and list out the static characteristics with necessary description. [6M]
- b) Write about multipliers, multi range voltmeters, multi range ammeters. [6M]
- c) The coil of a moving coil voltmeter is 40 mm long and 30 mm wide and has 100 turns on it. The control spring exerts a torque of  $240 \times 10^{-6}$  N-m when the deflection is 100 divisions on full scale. If the flux density of the magnetic field in the air gap is  $1.0 \text{ weber/m}^2$ , estimate the resistance that must be put in series with the coil to give one volt per division. The resistance of the voltmeter coil may be neglected. [4M]
- 3 a) Describe the feature incorporated in an electro dynamometer wattmeter to make it a low power factor type of wattmeter. [6M]
- b) Explain the procedure to measure power using instrument transformers with the help of phasor diagrams and correction factors [5M]
- c) The constant for a three phase, 3 element integrating wattmeter is 0.12 revolution of disc per kWh. If the meter is normally used with a potential transformer of ratio 22000/110 V and a current transformer of ratio 500/5 A; find the error expressed as a percentage of the correct reading from the following test figures for the instrument only: Line voltage=100 V, current=5.25 A, power factor=1, time to complete 40 revolutions=61 sec. [5M]

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**R13****SET - 1**

- 4 a) Explain about Gall-Tinsley AC potentiometer with necessary connection diagram. [8M]  
b) In the measurement of power by a polar potentiometer, the following readings were obtained: Voltage across a  $0.2 \Omega$  standard resistance in series with the load =  $1.46 \angle 32^\circ$ , Voltage across a 200:1 potential divider across the line =  $1.37 \angle 56^\circ$  V. Estimate the current, voltage, power and power factor of the load. [8M]
- 5 a) Explain about the measurement of relative permittivity with necessary bridge equations. [5M]  
b) Explain about measurement of mutual inductance in terms of standard capacitance using Heydweiller Bridge with necessary equations. [7M]  
c) Explain the precautions and techniques used for reducing errors in bridges. [4M]
- 6 Explain about ballistic tests for the determination of magnetic flux density, magnetizing force, magnetic potentiometer, B-H curve and Hysteresis loop. [16M]
- 7 a) Explain the basic circuitry of cathode ray oscilloscope. [8M]  
b) Explain the procedure to measure angle of phase shift using Lissajous patterns. [8M]

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