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 electrodynamometer 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 x 10^{-6} N-m when the deflection is 100 divisions on full scale. If the flux density of the magnetic filed in the air gap is 1.0 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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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 Ω standard resistance in series with the load=1.46∟32deg, Voltage across a 200:1 potential divider across the line = 1.37∟56 degV. 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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