Code No: RT31021 **R13** SET - 1

III B. Tech I Semester Supplementary Examinations, May – 2017

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 how instrument transformers are a better substitute for shunts especially for high range values?	[3M]
	b)	Write short notes on Synchroscope.	[4M]
	c)	If the slide wire has divisions marked in mm and each division can be interpolated to one fifth, calculate the resolution of the instrument.	[4M]
	d)	Explain the function and working of wagner Earth devices.	[3M]
	e)	Describe briefly the different types of tests that are used for testing of magnetic Materials?	[4M]
	f)	Explain the functions of a ramp type digital voltmeter?	[4M]

PART -B

2	a)	What are the different types of instruments that are used as ammeters and voltmeters? What are the errors that occur in ammeters and voltmeters?	[8M]
	b)	The spring constant of 3000V electrostatic voltmeter is 7.06×10^{-6} Nm/rad. The full scale deflection of the instrument is 80^0. Assuming the rate of change of capacitance with angular deflection to be constant over the operating range, Calculate the total change of capacitance from zero to full scale.	[8M]
3	a)	What are the different methods of measurement of frequency in the power frequency range?	[3M]
	b)	An energy meter is designed to make 100 revolutions of the disc for one unit of energy. Calculate the no. of revolutions made by it when connected to a load carrying 20A at 230volts at 0.8 pf for an hour. If it actually makes 360 revolutions, find the percentage error.	[8M]
	c)	A single phase induction type energy meter is adjusted to read correctly at unity pf. It is observed that 1/4 full load current at 0.5 lagging p.f the effective voltage magnet flux lags behind the current magnet flux by 27^0, Will it introduce any error in the measurement? If so, calculate the percentage error introduced.	[5M]
4	a)	With a neat sketch explain the operation of a potentiometer what is standardization? How is it achieved?	[8M]
	b)	A simple slide wire is used for measurement of current in a circuit. The voltage drop across a standard resistor of 0.1 Ω is balanced at 75 cm. Find the magnitude of the current if the standard cell emf of 1.45 V is balanced at 50cm.	[8M]
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5	a)	Describe how relative permittivity of a specimen of insulating material can be determined using a schering bridge.	[8M]
	b)	A bridge consists of arm ab, a choke coil having a resistance R_1 and inductance L_1. arm bc a non-inductive resistance R_3. When this bridge is fed from a source of 500Hz, balance is obtained under following conditions: R_2=2410 Ω, R_3=750 Ω, C_4=0.35μF, R_4=64.5 Ω. The series resistance of capacitance is =0.4 Ω. Calculate the resistance and inductance of the choke coil. The supply is connected between a and c and the detector is between b and d.	[8M]
6	a)	Discuss the measurement of core losses by using potentiometer method?	[8M]
	b)	The iron loss in a sample is 300W at 50Hz. with eddy current loss component5 times as big as the hysteresis loss component. At what frequency will the iron loss be double if the flux density is kept the same?	[8M]
7		Explain the following with neat sketch (a) Successive approximation DVM (b) Digital frequency meter	[16M]

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