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10EE35

Third Semester B.E. Degree Examination, January 2013
Electrical and Electronic Measurements and Instrumentation

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Obtain the dimensional equations for resisting and conductivity in S.I. Units. **(04 Marks)**

b. Explain with neat sketch how megger is used for the measurement of very high resistance. **(06 Marks)**

c. Obtain wheatstone bridge sensitivity in terms of the parameters of the bridge. **(10 Marks)**

2 a. Explain how capacitance and dissipation factor is measured using Schering bridge. **(07 Marks)**

b. Explain how Anderson's bridge used for measurement of inductance of the coil. **(08 Marks)**

c. The four arms of AC bridge are as: Arm AB: An insulating material representing an imperfect capacitor, Arm BC: a non inductive resistance of 1200 Ω, Arm DA: a loss free capacitor of 100 μμF, Arm CD: A resistance 300 Ω in parallel with capacitance of 0.6 μF. An AC supply of 50 Hz is connected across AC and detector is connected across BD. Determine capacitance, equivalent series resistance and loss angle of insulating material. **(05 Marks)**

3 a. Explain construction of CT and PT with their necessary phasors. **(10 Marks)**

b. A wattmeter has resistance of current coil and resistanc of potential coil as 0.1 Ω and 6500 Ω respectively. Determine percentage error due to resistance only, when reading of input to an apparatus which takes, i) 12 Amps at 250 volts with 4 pf ii) 12 Amps, 250 volts with 0.4 pf. **(10 Marks)**

4 a. With neat sketch explain construction and operating principle of induction type energy meter. **(10 Marks)**

b. Explain how 3-ϕ reactive power is measured. **(05 Marks)**

c. A 250 volts, 1-ϕ energy meter has constant load of 6 Amps passing through it for 8 hours at 0.75 pf. If the disc makes 3200 revolution during this period, what is the energy meter constant in revolutions/kilowatt hour? Calculate the power factor of the load, if the number of revolutions made by energy meter is 600, when operating at 250 volts, 6 Amps for 2 hours. **(05 Marks)**

PART – B

5 a. With necessary sketches, explain the construction and operating principle of 1-ϕ power factor meter. **(08 Marks)**

b. Explain with neat figure TRUE RMS responding meter. **(06 Marks)**

c. Compute the value of distributed capacitance of a coil when the following measurements were made. At frequency f_1 = 2 MHz, the tuning capacitor is set at 450 PF. When the frequency is increased to 5 MHz, the tuning capacitor is tuned at 60 PF. **(06 Marks)**

6 a. Classify the transducers with an example. **(04 Marks)**

b. Explain construction and operating principle of LVDT with necessary sketches. **(10 Marks)**

c. List out the temperature detectors. Explain resistance temperature detector. **(06 Marks)**

7 a. What do you mean by DAS (Data Accquisition System)? Explain with the block diagram digital DAS. **(08 Marks)**

b. Why recorders are necessary? Explain X-Y recorder with neat diagram. **(08 Marks)**

c. Write a short note on LED and Nixie tube. **(04 Marks)**

8 Write a short notes on the following:

a. Weston frequency meter.

b. Ramp type DVM.

c. Types of strain gauges.

d. Photoconductive cells. **(20 Marks)**

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