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Third Semester B.E. Degree Examination, June/July 2014

Electrical and Electronic Measurement 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. With necessary sketch, explain Megger. **(06 Marks)**
   b. Obtain sensitivity of Wheatstone bridge in terms of its parameters of the bridge. **(10 Marks)**
   c. The capacitance of the parallel plate capacitor is given by $C = \dfrac{\varepsilon A}{t}$ where ε = absolute permittivity, A = area of plate of capacitor, t = thickness of dielectric. Show that the equation is dimensionally correct. **(04 Marks)**

2. a. Explain using Schering bridge, how the capacitance and dissipation factor of unknown capacitor is measured. **(10 Marks)**
   b. In an Anderson bridge for the measurement of inductance, the arm AB consists of an unknown inductance of L and resistance of R, a known variable resistance in arm BC, fixed resistance of 600 Ω in arms CD and DA, a known variable resistance in arm DE and a condenser with fixed capacitance of 1µF in arm CE. The supply with frequency 100 Hz is connected across AC and detector is between B and E. If the balance is obtained with a resistance of 400 Ω in arm DE and resistance of 800 Ω in arm BC, determine the values of L and R. **(04 Marks)**
   c. In Wheatstone bridge, the resistance of various arms are P = 1 KΩ, Q = 100 Ω, R = 2005 Ω and S = 200 Ω. The battery has an emf = 5V and negligible internal resistance. The galvanometer has a current sensitivity of 11 mm/µA and internal resistance of 102 Ω. Determine the deflection of the galvanometer and sensitivity of the bridge in terms of deflection per unit change of resistance. **(06 Marks)**

3. a. Bring out the difference between CT and PT. **(04 Marks)**
   b. Explain Silshee's method of testing the CT. **(06 Marks)**
   c. With necessary sketch, explain operating principle of dynamometer Wattmeter. **(10 Marks)**

4. a. With neat sketch, explain construction and working principle of kwh meter. **(10 Marks)**
   b. Explain how kwh meter is calibrated, with necessary details. **(06 Marks)**
   c. The name plate details of 1-φ kwh meter reads as 250 V, 20 A, 1800 rev/kwh. The meter is tested at 0.75% of load at upf. The meter makes 20 revolutions in 10 sec. Find the % error in reading of energy meter. **(04 Marks)**

PART – B

5. a. Explain with necessary sketch 1-φ, electro-dynamometer power factor meter. **(08 Marks)**
   b. Explain with neat sketch to measure the rms value of voltage of complex waveforms. **(07 Marks)**
   c. What are the errors in the measurement of Q-factor of a coil? Explain. **(05 Marks)**

6   a.   Write a note on digital storage oscilloscope.   (05 Marks)
      b.   Explain ramp type digital voltmeter with sketch.   (10 Marks)
      c.   Explain principle of Q-meter. What are the applications of Q-meter? Explain.   (05 Marks)

7   a.   Classify the transducers. Explain factors considered for the selection of transducers.
                           (05 Marks)
      b.   With sketch explain in detail, LVDT used for the measurement of linear displacement.
                           (10 Marks)
      c.   Explain different types of strain gauges.   (05 Marks)

8   a.   What do you mean by DAS? Explain. With sketch, explain digital DAS.   (05 Marks)
      b.   Classify the recorders. Explain x-y recorder with sketch.   (08 Marks)
      c.   With sketch explain function generator.   (07 Marks)

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