National Institute of Technology Delhi

Mid Semester Examinations: B.Tech

Name of Specialization: Electrical & Electronics Engg   Year: Second   Semester: III

Course Name: Electrical Measurements and Instrumentation   Maximum Marks – 25

Course Code: EEB-202   **Total Time: 2:00 Hours**

Note:
- All Questions are compulsory.
- Do not write irrelevant theory and draw neat diagrams.
- Assume data where ever required.

Q1) Draw the neat diagram of Anderson bridge. Deduce the equations when the bridge is under balanced condition. Explain clearly how you can measure self-inductance by using this bridge. Draw the phasor diagram of the voltages and currents of the bridge arms at balance. Discuss the advantages and disadvantages of this bridge.   (5)

Q2) Describe the working of Hay's bridge for measurement of inductance. Derive the equations for balance and draw the phasor diagram under conditions of balance. Why is this bridge suited for measurement of inductance for high Q coils? Discuss its advantages and disadvantages.   (5)

Q3) Describe the Carey Foster's bridge along with phasor diagram for the measurement of capacitance in terms of mutual inductance.   (4)

Q4) In a Kelvin double bridge, there is error due to mismatch between the ratios of outer and inner arm resistances. The following data relate to this bridge:

Standard resistance = $100.03\,\mu\Omega$; inner ratio arms = 100.31Ω and 200Ω; Outer ratio arms = 100.24Ω and 200Ω; The resistance of connecting leads from standard to unknown resistor is $680\,\mu\Omega$. Calculate the unknown resistance. (3)

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Q5) Explain briefly Dead Zone and Dead Time   (2)

Q6) Determine the resolution of a digital voltmeter which has a read-out range of 0 to 9999 counts & its full scale reading is 9.999V.   (2)

Q7) Two capacitors $150\pm2.4\mu F$ & $120\pm1.5\mu F$ are connected in parallel. Determine the limiting error of the resultant capacitance in μF & in percentage.   (2)

Q8) A 0-150 Pa manometer has a guaranteed accuracy of 1 percent of full scale reading. The pressure measured by this instrument is 75 Pa. Calculate the limiting error in percent   (2)