National Institute of Technology Delhi

Mid Semester Examinations Oct 2022: 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: 1:30 Hours**

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

Q1) 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)

Q2) Describe the working & phasor diagram along with the connection diagram of the Heaviside Campbell bridge for precise measurement of self-inductance of a coil. Deduce the formula used.   (5)

Q3) Three resistors have the following ratings:

$R_1 = 200\Omega \pm 5\%$, $R_2 = 100\Omega \pm 5\%$ & $R_3 = 50\Omega \pm 5\%$

Determine the magnitude of the resultant resistance and limiting errors in percentage and ohms, if the above resistances are connected in (a) Series & (b) Parallel   (5)

Q4) Describe the working of Owen bridge. Derive the equations for balance and draw the phasor diagram under conditions of balance. Discuss its advantages and disadvantages.   (5)

Q5) 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)

Q6) The calibration range of a certain pyrometer is 300^0 C to 800^0 C. If the dead zone in it is 0.11 percent of span, determine the temperature change which might occur before it is detected.   (1)

Q7) A thermometer reads 92.35 ^{0}C and the static correction given in the correction curves is -0.07^{0}C. Determine the true value of temperature.   (1)

Q8) What is an "Error calibration curve"   (1)