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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech III Year I Semester Examinations, March - 2021
MEASUREMENTS AND INSTRUMENTATION
(Electrical and Electronics Engineering)

Time: 3 Hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

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1.a) A basic d' Arsonval meter movement with an internal resistance, $Rm = 100\Omega$ and a full scale current of $Im = 1mA$ is to be converted in to a multi range D.C. voltmeter with ranges of 0-10V, 0- 50V, 0- 250V,0-500V. Determine the values of various resistances required for potential divider arrangement.
  b) How can you extend the range of Electro static Voltmeters? Elaborate. [8+7]

2.a) Compare Polar and Coordinate type AC potentiometers.
  b) Conclude the need of Potential transformer? And list different errors occurred in PTs. [8+7]

3.a) How can you test energy meter by phantom loading? Explain.
  b) Explain the construction and working of three element dynamometer wattmeter. [7+8]

4.a) How could you measure medium resistance using bridge ? Elaborate.
  b) Construct the circuit Maxwell's bridge and develop relation for unknown inductance. [8+7]

5.a) Explain the principle of operation of Thermocouple and mention its advantages.
  b) Discuss principle of operation of Capacitance transducers and list their applications. [8+7]

6.a) Explain the Principle and working of DC potentiometer with a neat sketch.
  b) Explain the working principle of repulsion type moving iron instrument. [7+8]

7.a) Prove that for electrodynamometer type wattmeter
   True power = $\{\cos \Phi / [\cos \Phi \cos (\Phi - \beta)]\}$ x actual wattmeter reading
   Where $\cos \Phi$ = power factor of the circuit
      $\beta = \tan^{-1} (\omega L/R)$ where L and R are the inductance and resistance of the pressure coil of the circuit.
  b) How could you measure frequency using Wein's bridge? Discuss with the help of diagram. [8+7]

8.a) Discuss principle of operation of True RMS meters.
  b) Categorize the errors occurred in instrument transformers and describe them. [7+8]

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