

R16

Code No: 135AN

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, October - 2020

ELECTRICAL MEASUREMENTS AND INSTRUMENTATION

(Electrical and Electronics Engineering)

Time: 2 Hours

Max. Marks: 75

Answer any five questions
All questions carry equal marks

- 1.a) A basic d' Arsonval meter movement with an internal resistance, $R_m=100\Omega$ and a full scale current of $I_m=1mA$, 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) Explain the principle of working of Quadrant electrometer type Electrostatic voltmeter and mention its applications. [7+8]
- 2.a) Explain the working principle of repulsion type moving iron instrument.
- b) Explain the construction and working of PMMC instrument with torque expressions. [7+8]
- 3.a) Explain the Principle and working of DC potentiometer with a neat sketch
- b) Categorize the errors occurred in instrument transformers. [8+7]
- 4.a) Conclude the need of AC potentiometers, list the advantages and disadvantages of them.
- b) Differentiate and compare C.T and P.T. [8+7]
- 5.a) Prove that for electro-dynamometer 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) Explain how can you provide overload compensation to of single phase induction type energy meter. [7+8]
- 6.a) Explain three phase energy measurement using Tri-vector meter
- b) Explain the construction and working of two element dynamometer wattmeter. [7+8]
- 7.a) How could you measure frequency using Wein's bridge? Discuss with the help of diagram.
- b) Construct the circuit of Schering bridge and develop relation for unknown capacitance. [7+8]
- 8.a) Explain the principle of strain gauge? And develop relation for gauge factor.
- b) Explain the construction and working of Thermocouple and mention its advantages. [7+8]

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