

Code No: 155CB

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year I Semester Examinations, February - 2022

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 moving coil instrument gives a full-scale deflection of 10mA when the potential difference across its terminal is 100mV. Calculate,
i) The shunt resistance for a full-scale deflection of 100A
ii) Find the resistance for full-scale reading with 100V
Also, calculate the power dissipation in each case.
b) Derive an equation for the torque developed in PMMC instrument. [8+7]
- 2.a) A PMMC ammeter has following specification, coil dimension of 1cm×1cm, spring constant is 0.15×10^{-6} N-m/rad, Flux density is 1.5×10^{-3} wb/m². Determine the number of turns required to produce a deflection of 90⁰, when a current of 2mA flows through the coil.
b) With the help of a neat diagram, explain the working of attracted disc type voltmeter. [7+8]
- 3.a) Discuss how AC potentiometer can be used for calibration of wattmeter.
b) Explain the procedure to calibrate voltmeter and ammeter using DC potentiometer. [8+7]
- 4.a) With help of a neat diagram explain the working of coordinate type potentiometer.
b) Draw the equivalent circuit diagram and phasor diagram of the current transformer. [8+7]
- 5.a) Discuss the construction and Working Principle of Electrodynamic type 1-φ wattmeter with help of a neat diagram.
b) Explain any two errors that occur in electrodynamic type 1-φ wattmeter and its compensation. [9+6]
- 6.a) With help of a neat diagram, explain the construction and working of a three-phase energy meter.
b) Two-watt meters are connected to measure the input to a balanced 3 phase circuit indicating 2000W and 500W respectively. Find the power factor of a circuit,
i) When both the reading is positive and
ii) When the latter reading is obtained after reversing the connections to the current coil of the first instrument. [9+6]

- 7.a) Draw the circuit of Kelvin double bridge used for measurement of low resistance. Explain its working principle
- b) An AC bridge is balanced at 2KHz with the following components in each arm: Arm AB=10K Ω , Arm BC=100 μ F in series with 100K Ω , Arm AD=50K Ω . Find the unknown impedance $R \pm jX$ in the arm DC, if the detector is between BD. [8+7]
- 8.a) Derive an equation for gauge factor in strain gauge.
- b) With help of a neat diagram, explain the principle and working of LVDT. [7+8]

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