Code No: 155CB

**R18**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**
**B. Tech III Year I Semester Examinations, September - 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) By utilizing attracted disc technique explain how electrostatic voltmeter works with help of neat diagram.
b) 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 corresponding to 100A (ii) The resistance for full-scale reading with 1000V. Calculate the power dissipation in each case . [8+7]

2.a) A PMMC ammeter has the following specification Coil dimension are 1cm× 1cm. Spring constant is $0.15\times10^{-6}$ N m / rad, Flux density is $1.5\times10^{-3}$ wb / m. Determine the number of turns required to produce a deflection of 900 when a current 2mA flows through the coil.
b) Describe the construction and working of PMMC instrument. Derive the equation for deflection if the instruments are spring controlled. [7+8]

3. Differentiate between a C.T. and P.T. Discuss the theory of a P.T with phasor diagrams. Derive the expression for actual transformation ratio, ratio error and phasor angle error of a P.T. [15]

4. Discuss the major sources of errors in the current transformer. What are the means to reduce errors in CT? Explain the design and constructional feature to reduce the error. [15]

5. Explain the construction and working of induction type single-phase energy meter with a neat diagram and derive its equation. [15]

6.a) Explain the principle of working of LPF wattmeter.
b) Explain the operation of a three-phase dynamometer type wattmeter. [7+8]

7.a) Describe the circuit of Kelvin double bridge used for measurement of low resistance. Derive the conditions for balance.
b) Derive an equation for Wien's bridge at balance with a circuit diagram and explain the measurement procedure for measuring unknown frequency using this bridge. [7+8]

8.a) How the transducers are classified based on the principle of operation?
b) Explain the construction and principle of working of an LVDT. [7+8]

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