

II B. Tech II Semester Regular/Supplementary Examinations, November - 2020**ELECTRICAL MEASUREMENTS**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answer **ALL** the question in **Part-A**
 3. Answer any **FOUR** Questions from **Part-B**

PART -A

1. a) What is dead time of the instrument? (2M)
- b) Why the phase of shunt flux is made exactly in quadrature with applied voltage? (3M)
- c) Explain the disadvantage of Desauty Bridge and how this disadvantage is overcome by modified Desauty Bridge? (2M)
- d) Explain operation of potentiometers? (3M)
- e) Why we need to discuss B-H curve? (2M)
- f) Define Integrating type meter? (2M)

PART -B

2. a) Derive the expression for transformation ratio of a C.T referred to primary and secondary side with the help of phasor diagram. (7M)
- b) The inductance of a moving iron ammeter with a full scale deflection of 90 at 1.5 A, is giving by the expression $L = (200 + 400 - 4\theta - \theta^2)\mu\text{H}$, where θ is the deflection in radian from the zero position. Estimate the angular deflection of the pointer for a current of 1.0A. (7M)
3. a) Explain the construction and principle of operation of single phase dynamometer type wattmeter? (7M)
- b) The wattmeter is rated at 10A and 25V. The current coil has a resistance of 0.006 ohms and reactance of 0.0 ohms. The potential coil circuit may be assumed to be purely resistive having a resistance of 6250 ohms. find the error due to two different connections of wattmeter. The load is 10A at a power factor of 0.174 lagging. The voltage across the load is 25V. (7M)
4. a) Explain the operating principle and constructional details of AC polar type potentiometer, how it is standardized. (7M)
- b) A control potentiometer is rated as : resistance = 150Ω , power rating = 1W. Derate the potentiometer by $10\text{mW}/^\circ\text{C}$, thermal resistance = $30^\circ\text{C}/\text{W}$. Can the potentiometer be used with a 10 V supply at 80°C ambient temperature? (7M)
5. a) Derive the expression for balance in the case of Maxwell's inductance-capacitance bridge. What is quality factor? Why this bridge is suitable for coil having low Q-factor? What is the advantages and disadvantages of this bridge. (7M)
- b) An ac bridge was made up as follows: arm ab, a capacitor of 0.8 mF in parallel with 1 kW resistance, bc a resistance of 3 kW, arm cd an unknown capacitor C_x and R_x in series, arm da a capacitance of 0.4 mF. The supply at 1 kHz is connected across bd and a detector across ac. Determine the value of unknown capacitance C_x , unknown series resistance R_x and dissipation factor (7M)

6. a) Explain working of ballistic galvanometer with circuit diagram? (7M)
- b) Explain the methods of separation of iron losses into their two components: eddy current and hysteresis losses, if the maximum value of flux density is maintained constant and form factor is varied keeping the frequency constant (7M)
7. a) Describe how the following measurements can be made with the use of a CRO. (i) Frequency (ii) Phase angle. (7M)
- b) Explain successive-approximation type DVM with diagram. (7M)

