

MASTER

- N. B. : (1) Question No. 1 is compulsory.  
 (2) Attempt any four questions out of remaining questions.  
 (3) Figures to the right indicates full marks.

1. (a) State and define basic types of electrical measuring instruments. Indry  
marks  
20  
 (b) Derive the relation between the electrostatic and electromagnetic system of unit. 35/50  
 (c) Explain why the Wheatstone bridge is not used for measuring low value of resistance.  
 (d) State the advantages and disadvantages of flux meter.

2. (a) Explain different types of error in detail. 10  
 (b) Use dimensional equation to find out whether the following expression is dimensionally correct or not. 10

$$R_4 = \frac{R_2 (1 + W^2 R_3^2 C_3^2)}{W^2 R_1 R_3 C_3}$$

where  $R_1, R_2, R_3$  and  $R_4$  are resistances.  
 $C_3$  is capacitance and  
 $W = 2 \pi f$ ,  $f$  is frequency in Hz.

3. (a) What are the different difficulties encountered in the measurement of high resistance ? Explain how these difficulties are overcome. 10  
 (b) Describe the operation of vibration galvanometer and derive the expression for amplitude of vibration. 10
4. (a) A moving coil instrument gives a full scale deflection of 10 mA when potential difference across its terminal is 10 mV.  
 Calculate :—  
 (i) The shunt resistance required to be connected for a full scale deflection of 100 Amp.  
 (ii) Series resistance for full scale reading of 1000 Volt. 10  
 (b) Explain Hay's bridge for measuring self inductance. Draw neat circuit and phasor diagram. Derive expression for self inductance. 10
5. (a) Explain any one type of power factor meter. 10  
 (b) A energy meter is designed to make 1200 revolution of disc for one unit of energy (kWh). Calculate the number of revolution made by it when connected to load carrying 10 A, at 240 V and 0.4 power factor for 1 hour. If it actually make 1140 revolution. Find the percentage error. 10
6. (a) Draw the equivalent circuit and phasor diagram of a potential transformer. Derive the expression for ratio and phase angle error. 10  
 (b) Explain the Laboratory type of d.c. potentiometer in detail. 10
7. Write short notes on any three :— 20  
 (a) Synchroscope  
 (b) Megger  
 (c) Frequency Meter  
 (d) Epstein Square Method  
 (e) Paramagnetism and Ferromagnetism.