

SUBJECT CODE:- 482
FACULTY OF ENGINEERING AND TECHNOLOGY
S.E.(EEP/EE/EEE) Examination Nov/Dec 2015
Electrical Measuring Techniques
(Revised)

[Time: Three Hours]

[Max. Marks: 80]

“Please check whether you have got the right question paper.”

N.B i) Q.No.1 from section A and Q.No.6 from section B are compulsory.

ii) Attempt any two questions from the remaining questions in each section.

iii) Assume suitable data, if necessary.

Section A

- Q.1 Solve any five questions of the following. 10
- i) List any four static characteristics of measuring system.
 - ii) Define the term accuracy and linearity.
 - iii) What is difference between absolute error and relative error?
 - iv) Explain absolute instruments.
 - v) The measured value of resistance is 10.5Ω where as its value is 10.45Ω determine absolute error in measurement.
 - vi) What are advantages of bridge circuit?
 - vii) Define quality factor.
 - viii) What are the classifications of measurement resistance with range?
- Q.2 a) Describe the construction and working of PMMC instrument. 08
 b) A moving coil voltmeter with a resistance 20Ω gives a full scale deflection of 120° when potential difference of 120mv is applied across it. The moving coil has dimension of $35\text{mm} \times 30\text{mm}$ and is wound with 120 turns the control spring constant is 0.375×10^{-6} N-m/dig. Find the flux density in the air gap. Find also diameter of copper wire of coil winding if 30% of instrument resistance is resistance for copper = $1.7 \times 10^{-8}\Omega\text{m}$. 07
- Q.3 a) Explain construction and working of Kelvin's double bridge. 08
 b) AC bridge is balanced at 2 KHz. With following components in each arm. $AB = 10K\Omega$, $BC = 100\mu f$ in series with $100K\Omega$ $AD = 50K\Omega$ DC = unknown impedance find out unknown impedance ($R \pm jx$) if the balance is between BD. 07
- Q.4 a) Derive the power equation for 3- ϕ system for balance load. Using two wattmeter methods when watt meters star connected. 08
 b) Two wattmeter connected to measure the power supplied to a 3 phase, 500V, circuit indicate the total input to be 10 KW. The power factor is 0.3 lagging find the reading on each wattmeter. 07
- Q.5 a) Explain shunt and multipliers for extension of range of ammeter and voltage. 05
 b) Explain De sauty Bridge for measurement of capacitance. 05
 c) Explain measurement of earth resistance using fall potential method. 05

Section B

- Q.6 Solve any five questions of the following. 10
- i) What are the applications of CRO?
 - ii) What are the limitations of oscilloscope?
 - iii) What are basic requirements of transducer?
 - iv) List the applications of capacitive transducer.
 - v) What is meant by turn's compensation and why is it done.
 - vi) The power input to 3- ϕ .IM is read by 2- wattmeter. The readings are 850watt and 200watt. Calculate the power factor. Of the motor.
 - vii) How PT is differing from a power transformer?
 - viii) What do you understand by the phase angle error of PT.

- Q.7 a) What are the types of errors occurs in energy meter. 08
 b) A single phase energy meter has a constant of 6000 rev/kwh. A test was carried out with a resistive load for one 07
 minute during which the meter made 21 revolutions. The voltage was 110volts. And current was 2A. Calculate %
 error.
- Q.8 a) What are advantages of CT and PT over shunt and multipliers for range extension? 08
 b) A 1000/5A, 50Hz CT has secondary load comprising a non-reactive resistance of 1.6Ω . The primary winding has 07
 one turn. Calculate the flux in the core and the current ratio error on full load. The iron loss in the core is 1.5W
 at full-load. Neglect leakage reactance.
- Q.9 a) Explain power measurement in 3ϕ system for unbalanced load using three wattmeter methods. 07
 b) Explain the dual beam CRO. Working with the help of block diagram. 08
- Q.10 a) Explain inductive and resistive type of transducer. 08
 b) Explain the various sources of error and compensation in 1ϕ energy meter. 07