



Name :

Roll No. :

Invigilator's Signature :

CS/B.TECH(EE/EEE/ICE/PWE)(NEW)/SEM-4/EE-402/2012

2012

ELECTRICAL AND ELECTRONIC MEASUREMENT

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

$$10 \times 1 = 10$$

- i) In measurement systems, which of the following static characteristic(s) is/are desirable ?
 - a) Accuracy
 - b) Sensitivity
 - c) Reproducibility
 - d) All of these.
- ii) Frequency can be measured by using
 - a) Maxwell bridge
 - b) Schering bridge
 - c) Heaviside-Campbell bridge
 - d) Wien's bridge.



- iii) In a CRT the focusing anode is located
- a) between pre-accelerating and accelerating anodes
 - b) after accelerating anode
 - c) before pre-accelerating anode
 - d) none of these.
- iv) LVDT is a
- a) capacitive transducer
 - b) resistive transducer
 - c) inductive transducer
 - d) none of these.
- v) The potentiometer is basically an instrument of
- a) digital type
 - b) deflection type
 - c) null type
 - d) recording type.



- vi) A megger is used for measurement of
- a) low valued resistance
 - b) medium valued resistances
 - c) high valued resistances
 - d) all of these.
- vii) Murray loop test is used for location of
- a) short circuit fault on a cable
 - b) ground fault on a cable
 - c) both (a) and (b)
 - d) open circuit fault.
- viii) Calibration of DC potentiometer is done with the help of standard cell of voltage
- a) 1.5 V
 - b) 1.01864 V
 - c) 1.001864 V
 - d) 1.0864 V.



- ix) Creeping is observed in
 - a) watt-hour meter
 - b) wattmeter
 - c) ammeter
 - d) power factor meter.
- x) The secondary of a CT is
 - a) never left open circuited
 - b) never left short circuited
 - c) always kept open circuited
 - d) none of these.
- xi) The high torque to weight ratio in an analog instrument indicates
 - a) high friction loss
 - b) low friction loss
 - c) nothing as regards friction loss
 - d) none of these.



GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Define the terms Accuracy, Precision, Resolution, Drift and Relative limiting error.
3. Explain the difference between Dynamometer type wattmeter and induction type wattmeter.
4. What is phantom loading ? Explain with an example how it is more advantageous than testing with direct loading.
5. Show that driving torque in a moving iron instrument is given by $T_D = 0.5[I^2 dL/d\theta]$. Where the symbols have their usual meaning.
6. Draw and explain how low resistance is measured using Kelvin's Double bridge.

GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Describe in brief the construction and working principle of a single phase induction type energy meter.
b) What is Blondel's theorem ?

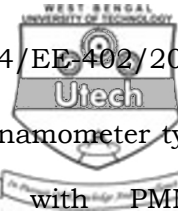


- c) A single phase kWhr meter makes 500 revolutions per kWhr. It is found on testing that it is making 40 revolutions in 58.1 seconds at 5 kW load. Find out the percentage of error. 8 + 3 + 4

8. a) Explain the functional block diagram of CRO with neat diagram.
- b) What is Lissagous figure ? Explain how phase & frequency can be measured using this figures.
- c) What are the differences between dual beam CRO & dual trace CRO ? What is the function of delay line ?

$$6 + (2 + 3) + (3 + 1)$$

9. a) Draw the circuit diagram of DC potentiometer & explain how it works.
- b) How can potentiometer be used for
- i) calibration of voltmeter
 - ii) calibration of wattmeter.
- c) What are the adjustment of induction type AC energy meter ? 5 + 5 + 5



10. Deduce the expression of torque of electrodynamicometer type instrument. Why multiplier is used with PMMC instrument ? What do you mean by sensitivity of PMMC instrument ? Why sensitivity of electrodynamicometer type instrument is low ? Why the scale of moving iron instrument is cramped at lower end ?

6 + 2 + 2 + 2 + 3

11. Write short notes on any *three* of the following :

3 × 5

- a) Digital Multimeter
- b) Rectifier type instrument
- c) Q-meter
- d) Megger
- e) Piezoelectric transducer
- f) LVDT.

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