

CBCS Scheme

USN

--	--	--	--	--	--	--	--	--	--

15EE36

Third Semester B.E. Degree Examination, Dec.2017/Jan.2018

Electrical and Electronic Measurements

Time: 3 hrs.

Max. Marks: 80

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.

2. All symbols andonyms have their usual meaning.

Module-1

- 1 a. Derive the dimensions of the following quantities with mass, length, time and current as the fundamental units :
i) Inductance ii) Capacitance iii) Electric Flux iv) Resistance v) Resistivity. (06 Marks)
- b. Illustrate with neat sketch, Kelvin double bridge to measure the internal resistance of an ammeter accurately. (06 Marks)
- c. The Thevenin's equivalent voltage of a Wheatstone bridge is 25mV and the galvanometer current is 20 μ A. The resistance of the galvanometer is 50 Ω . The ratio arms have resistances of 1000 Ω and 5000 Ω respectively. Find the value of the standard resistance for which the above conditions are satisfied. The value of the resistance to be measured is 600 Ω . (04 Marks)

OR

- 2 a. Discuss the fall of potential method of measurement of earth resistance. (04 Marks)
- b. With the neat circuit diagram, describe the operation of Maxwell Wein Bridge. List its merits and demerits. (06 Marks)
- c. Discuss the method of determining capacitance and dissipation factor using how voltage Schering bridge. (06 Marks)

Module-2

- 3 a. Discuss the errors and their compensating techniques used in dynamometer type Wattmeter. (05 Marks)
- b. Discuss the constructional features and working principle of rotating type phase sequence indicator. (06 Marks)
- c. A three phase induction motor draws a power input at a voltage of 250V, 20A and 0.8 power factor lag. Find percentage error in Wattmeter reading if :
i) Pressure coil is on supply side
ii) Current coil is on supply side
Assume current coil resistance and pressure coil resistance = 0.2 Ω and 5000 Ω . (05 Marks)

OR

- 4 a. Discuss the construction and working principle of electrodynamicometer type single phase power factor meter. (06 Marks)
- b. Explain the errors in a LPF wattmeter and give the adjustments done to compensate for the errors. (05 Marks)
- c. Explain the working principle of Weston frequency meter. (05 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-3

- 5 a. Discuss the procedure used to extend the range of DC ammeter and DC volt meter using shunts and multipliers. (07 Marks)
- b. Describe the operation of a current transformer using a phasor diagram. Differentiate a current transformer from a potential transformer. (09 Marks)

OR

- 6 a. A moving coil instrument has a resistance of 50Ω and gives a full scale reading of 50mA. Calculate :
 i) The shunt resistance required to increase the range to 200A
 ii) The series resistance required to use it as a voltmeter of range 0 – 750V
 iii) Power consumed in both the cases. (09 Marks)
- b. Describe the operation of potential transformer using equivalent circuit and phasor diagram. (07 Marks)

Module-4

- 7 a. Using a block diagram schematic, explain the working of an electronic energy meter. List the drawbacks of traditional energy meter. (08 Marks)
- b. With a neat sketch explain the working of the following :
 i) True rms reading voltmeter
 ii) Q meter. (08 Marks)

OR

- 8 a. With neat sketch, explain the working of the following :
 i) Integrating type DVM
 ii) Ramp type DVM. (08 Marks)
- b. Explain the working of electronic multimeter. (08 Marks)

Module-5

- 9 a. With a neat sketch explain the working of cathode ray tube. (08 Marks)
- b. With a neat sketch explain the working of the following :
 i) LED display
 ii) LCD display. (08 Marks)

OR

- 10 a. With appropriate sketch explain the working of strip chart recorder. (08 Marks)
- b. Write short notes on the following :
 i) X – Y recorders
 ii) LVDT type recorder. (08 Marks)

* * * * *