

Code: EE4T4

**II B.Tech - II Semester – Regular/Supplementary Examinations
April 2019**

**ELECTRICAL MEASUREMENTS AND
INSTRUMENTATION
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11 x 2 = 22

1.

- a) List out the different methods used to produce damping torque.
- b) Show the symbolic representation of wattmeter along with its terminals description.
- c) List the methods to test current transformers.
- d) Define ratio error and phase angle error in instrument transformers.
- e) Write the principle of operation of frequency meter.
- f) List the types of power factor meters.
- g) Write the balance equation of Carey Fosters bridge.
- h) Define quality factor in AC bridges.
- i) Write the principle of operation of transducers.
- j) Show the connections of resistance thermometers for temperature measurement.
- k) Write the working of strain gauge.

PART – B

Answer any **THREE** questions. All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2. a) Draw a necessary diagram for measurement of three phase power by two wattmeter meter method and further derive the necessary equation for the measurement of power factor. 8 M
- b) A correctly adjusted, 1-phase, 220V induction watt hour meter has a meter constant of 585 revolutions per kWh. Determine the speed of the disc, for a current of 10A at a power factor of 0.85 lagging. If the lag adjustment is altered so that the phase angle between voltage flux and applied voltage is 75 deg. Calculate the error introduced at i) Unity pf and ii) 0.5 pf lagging. 8 M
3. a) Illustrate the differences of current transformer from an ordinary power transformer. 6 M
- b) A single turn 1000/5A, 50Hz CT has a non inductive burden of 1 ohm. The magnetizing current is 100A. Calculate the current ratio and phase angle. 5 M
- c) Explain about the major sources of errors in current transformers. 5 M

4. a) Explain the operation of dynamometer type power factor meter. Show that the deflection of the meter is equal to the power factor angle. 8 M
- b) Compare the differences between electrical resonance type and mechanical resonance type frequency meters. 8 M
5. a) Discuss about the effect of contact resistance and resistance of connecting leads is eliminated in the measurement of resistance by using Kelvin's double bridge. 4 M
- b) Explain about the problems associated with the measurement of high resistances. 7 M
- c) Illustrate the circuit diagram and phasor diagram of Maxwell's bridge. 5 M
6. a) Explain briefly the working principle of digital tachometer with the help of neat diagram. 8 M
- b) Explain in case of DVM 8 M
- i. 3 ½ digits
 - ii. 5 ½ digits
- Write the significance of ½ digit in DVM.