

# END TERM EXAMINATION

FOURTH SEMESTER [B. TECH.] MAY-JUNE 2016

Paper Code: ETEE-208

Subject: Electrical and Electronic Measuring Instruments

Time: 3 Hours

Maximum Marks: 75

Note: Attempt any five questions including Q no.1 which is compulsory. Select one question from each unit. Assume missing data, if any.

- Q1 (a) What is creeping? Explain how it can be prevented. (5)
- (b) Explain the effect of change in frequency on the performance of current transformer. (5)
- (c) What are the different types of detectors used for AC Bridges? Mention their frequency range of operation. (5)
- (d) Find the frequency of the vertical plates if the frequency applied to the horizontal plate is 75Hz for the pattern shown below. (5)



- (e) What are the advantages of LCD display over Nixie tube and LED display? (5)

### UNIT-I

- Q2 (a) A potential transformer, ratio 1000/100 volts has primary resistance = 94.5  $\Omega$ , secondary resistance = 0.86  $\Omega$ , primary reactance = 66.2  $\Omega$ , total equivalent reactance = 110  $\Omega$ , no load current = 0.2A at 0.4 power factor. Find phase angle error at no load, burden in VA at unity power factor at which the phase angle will be zero. (6.5)
- (b) Describe the Silsbee's method for testing of a current transformer. (6)
- Q3 (a) Describe the constructional details of an electrodynamicometer type wattmeter. Derive the expression for torque when the instrument is used on a.c. Why it is necessary to make the potential coil purely resistive. (6.5)
- (b) Discuss the various sources of errors in electrodynamicometer type wattmeter. (6)

### UNIT-II

- Q4 (a) Describe the working of low voltage Schering Bridge. Derive the equation for capacitance and dissipation factor. Draw the phasor diagram of the bridge under balance condition. (6.5)
- (b) The four arms of a bridge network are made up as follows: 'ab', a resistor of 50  $\Omega$  in parallel with an inductor of 0.2H; 'bc' a resistor of 100  $\Omega$ ; 'cd' an unknown resistor R in parallel with an unknown capacitor C; 'da', a resistor of 1000  $\Omega$ . A 50 Hz supply is applied across arm ac. Find R and C when the bridge is under balance condition. (6)

- Q5 (a) Explain the function and working of Wagner Earth Devices. (6.5)  
 (b) An Owen's bridge is used to measure the properties of a sample steel sheet at 2KHZ. At balance arm ab is test specimen; arm bc is a resistor of  $1K \Omega$ ; arm cd is a capacitor of  $0.1 \mu F$  and arm da is a resistor of  $1K \Omega$  in series with a capacitor  $0.124 \mu \Omega$ . Derive balance condition and calculate the impedance of the specimen under test condition. (6)

**UNIT-III**

- Q6 (a) Describe in detail the role and working of vertical amplifier used in a CRO. (6.5)  
 (b) Explain the theory and working of an LED. Describe its advantage. (6)
- Q7 Explain the following terms applied to digital displays: (12.5)  
 (a) Resolution  
 (b) Difference between  $3^{1/2}$  digit and 4 digit display  
 (c) Sensitivity of digital meter  
 (d) Accuracy specification of digital meters

**UNIT-IV**

- Q8 (a) How does the sensitivity of an ac voltmeter compare with the sensitivity of a dc voltmeter? (6.5)  
 (b) Explain the working of Dual beam CRO. (6)
- Q9 Describe the working of a sweep frequency generator. What are the sweeper errors? (12.5)

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