Printed pages: **Sub Code: REE302**

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B TECH
(SEM 3) THEORY EXAMINATION 2017-18
Electrical Measurement and Measuring Instruments

Time: 3 Hours ***Total Marks: 70***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

Section A

Q.1-Attempt all question in brief. (7*2=14)

a. Distinguish clearly between Resolution & Precision.

b. Explain different way of classification of electrical transducers.

c. Differentiate between current transformer & potential transformer.

d. Why Kelvin's bridge is preferred for low resistance measurment ?

e. What is the major cause of creeping error in an energy meter?

f. Discuss the advantage of digital measurement over analog measurement.

g. What do you mean by lissajous pattern?

Section B

Attempt any Three questions in brief. (3*7=21)

a- Describe construction & working of electrodynamometer type wattmeter. Derive its torque equation.

b- A power primary C.T. Has 300 secondary turns. The total resistance and reactance for the secondary circuit are 1.5 & 1.0 secondary winding, the magnetizing mmf is 100 AT and iron loss component is 40A. Determine the ratio & phase angle of the C.T. at this load.

c-Derive the balance equation for modified De Sauty bridge. Also Explain its advantage over simple De Sauty Bridge. Also draw its phasor diagram.

d- The basic AC Bridge consists of the following constant:

Arm AB: R = 400 Ω

Arm BC: R = 150 Ω is series with C=0.2μF

Arm CD: unknown

Arm DA: R=100 Ω is series with L = 10 mH

The source oscillator frequency is 1 KHz .Determine the constant of the arm CD.

The source oscillator frequency is 1 KHz. Determine the constant of the arm CD.

e- Discuss the advantage of digital measurement. Draw and explain the Block diagram of Ramp type DVM.

Section C

3 .Attempt any one questions (1*7=7)

a- Output of an LVDT is connected to a 7V voltmeter thorough an amplifier. Whose amplification is 250? An output of 2mv appears across the terminals of LVDT when core move through a distance of 0.5mm. Calculate the sensitivity of the LVDT and that of whole set up. The millivolt scale has 1000 divisions. The scale can be read to 1/5 of a division. Calculate the resolution of the instrument in mm.

b. An Hall Effect element used for measuring a magnetic field strength gives an output voltage 10mv. The element is made of silicon and is 3.0×10^{-3}m thick and carries a current 2amp. The hall co-efficient is 4.1×10^{-6} vm/A- w/W. find magnetic field strength.

4.Attempt any one question. (1*7=7)

a. Describe the construction and working of Analog Storage CRO using block diagram.

b. Explain the working of Wave analyzer with the help of suitable block diagram.

5 .Attempt any one question. **(7*1=7)**

a. What is piezoelectric effect? Which crystals show this effect? Compare the materials as the basis of strength and piezoelectric activity.

b.-Define following terms.

(i) Gauge pressure (ii) Vacuum pressure

(iii) Absolute pressure (iv) Dynamic pressure.

6.Attempt any one question. **(7*1=7)**

a. Describe the modern digital data acquisition system.

b. A single phase potential transformer has a turn ratio of 4,000/70. The nominal secondary voltage is 536V & the total equivalent resistance & leakage reactance referred the secondary side are 2Ω & 1 Ω respectively. Calculate the ratio & phase angle error of PT supplying a Burdon of (100+200j) π.

7 .Attempt any one question. **(7*1=7)**

a. A cable is tested by loss of charge method using a ballistic galvanometer, with following results:
Discharged immediately after electrification, deflection 200 division. Discharge after 30 Sec. and after electrification (i) deflection 126 divisions (ii) when in parallel with a resist. of 10MΩ, deflection 100 division. Calculate the insulation resistance of the cable.

b. What is Seeback effect ? Explain the working principle and construction of thermocouple.