

5. Draw the circuit of a Kelvin's Double bridge used for measurement of low resistances. Derive the condition for balance.

OR

Derive the equation of balance for a low voltage Schering bridge. Draw the phasor diagram.

6. The iron loss in a sample is 300 W at 50 Hz with eddy current loss component 5 times as big as the hysteresis loss component. At what frequency will the iron loss be double if the flux density is kept the same ?

OR

Describe step by step method for determination of B-H curve of a magnetic material.

7. Attempt any two parts : (5×2=10)
- (a) Draw and explain the circuit of Digital Frequency Meter.
  - (b) Draw the circuit and describe the working of wave analyzer for audio-frequency range.
  - (c) Explain with the help of a block diagram, the working of Integrating type digital voltmeter.

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 1255

Roll No.

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B.Tech.

(SEM. III) ODD SEMESTER THEORY

EXAMINATION 2013-14

**ELECTRICAL AND ELECTRONICS MEASUREMENTS  
AND INSTRUMENTS**

Time : 3 Hours

Total Marks : 100

Note :- Attempt all questions.

**SECTION-A**

1. Attempt all parts : (2×10=20)
- (a) What is the difference between absolute error and relative error ?
  - (b) Differentiate between reproducibility and drift.
  - (c) Draw connection diagram of current transformer in single-phase system.
  - (d) Define meter constant in single-phase induction type energy meter.
  - (e) What are sources of error in ac bridge circuits ?
  - (f) Classify resistances from the point of view of measurements.
  - (g) Define standardization of AC Potentiometer.

- (h) How would 12.98 V and 0.6973 V be displayed on 10 V range of a 4½ digit display ?
- (i) Explain wave analyzer in measurement system.
- (j) Enlist difficulties encountered in measurement of high resistances.

### SECTION-B

2. Attempt any three parts : (10×3=30)
- (a) (i) What are different types of systematic error ? Discuss.  
 (ii) Describe the constructional details of single phase induction type energy meter.
- (b) A current transformer with a bar primary has 300 turns in its secondary winding. The resistance and reactance of secondary circuit are 1.5 Ω and 1.0 Ω respectively including the transformer winding with 5 A current flowing in secondary winding, the magnetizing mmf is 100 A and the iron loss is 1.2 W. Determine the ratio and phase angle error.
- (c) Derive the equation of balance for modified De Santy bridge. Draw the phasor diagram for balance condition.
- (d) Describe an experiment for obtaining flux density in a specimen of magnetic material with the help of a Ballistic galvanometer. How is the correction made for the flux in the air between the specimen and the coil ?
- (e) Draw a suitable block diagram to explain the working of Ramp type digital voltmeter.

### SECTION-C

Note :- Attempt all questions : (5×10=50)

3. Three resistors have the following ratings  $R_1 = 200 \Omega \pm 5\%$ ,  $R_2 = 100 \Omega \pm 5\%$ ,  $R_3 = 50 \Omega \pm 5\%$ . Determine the magnitude of resultant resistance and limiting errors in percentage and ohms, if the above resistances are connected in (i) Series (ii) Parallel.

OR

A dynamometer wattmeter is used to measure the power factor of a 20 μF capacitor. The pressure coil of the wattmeter having a resistance 1000 Ω and an inductive reactance of 15 Ω is connected across a 50 Hz supply. The current coil of the wattmeter, a variable resistor R and the capacitor are connected in series across the same supply. The wattmeter deflection is made zero by adjusting the value of R to 1.65 Ω. If the current coil resistance is 0.1 Ω and its inductance negligible, determine the power factor of the capacitor.

4. Attempt any two parts : (5×2=10)
- (a) Explain the method of turns compensation used in current transformers to reduce ratio error with the help of a suitable example.
- (b) Explain the methods for demagnetisation of the core of a current transformer whose secondary circuit has been accidentally opened when the primary winding was energised.
- (c) Explain the working of mechanical resonance type frequency meter.