

Question 1: Define:

- 1) Static Error and Relative error
- 2) Static Correction
- 3) Accuracy
- 4) Precision
- 5) Reproducibility
- 6) Drift
- 7) Dead time and Dead Zone
- 8) Sensitivity
- 9) Resolution or discrimination
- 10) Hysteresis

[Marks: 1*10]

Question 4.

Describe loss of charge method for measurement of high resistance.

[Marks: 5]

- 3) Accuracy

Question 5.

Explain Saturable core type frequency meter.

[Marks: 5]

- 6) Drift

Question 6.

Explain 1-phase power factor meter.

[Marks: 5]

Section-B

Question 2. Three resistors have the following rating:

$$R_1 = (200 \pm 5\%) \Omega,$$

$$R_2 = (100 \pm 5\%) \Omega,$$

$$R_3 = (50 \pm 2.5\%) \Omega,$$

Determine the magnitude of resultant resistance and the limiting errors in percentage and in ohm if the above resistances are connected in

(i) Series

(ii) Parallel

[Marks: 2+3]

Question 7.

Draw the equivalent circuit and phasor diagram of a current transformer. Derive the expressions for ratio and phase angle errors.

[Marks: 10]

A current transformer of turns ratio 1:199 is rated as 1000/5 A, 25 V.

The core loss and magnetizing component of the primary current are 4 and 7 A under rated conditions. Determine the phase angle and ratio errors for the rated burden and rated secondary current at 0.8 p.f. lagging and 0.8 p.f. leading. Neglect the resistance and leakage resistance of secondary winding.

Question 3.

[Marks: 5]

Why to use Wien's Bridge? Explain in detail its working.

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Question 8.**[Marks: 10]**

Derive the equations of balance for an Anderson's bridge. Draw the phasor diagram for conditions under balance.

The arms of a five node bridge are as follows:

- arm 'ab':** an unknown impedance (R_1, L_1) in series with a non-inductive variable resistor r_1 ($= 43.1\Omega$)
- arm 'bc':** a non-inductive resistor $R_3 = 100\Omega$
- arm 'cd':** a non-inductive resistor $R_4 = 200\Omega$,
- arm 'da':** a non-inductive resistor $R_2 = 250\Omega$
- arm 'de':** a non-inductive variable resistor r ($= 229.7\Omega$)
- arm 'ec':** a loss-less capacitor $C = 1\mu F$
- arm 'be':** a detector

Calculate the resistance R_1 and L_1 when under balance conditions.

Question 9.**[Marks: 10]**

What are the conditions for the formation of straight line, circle and ellipse? Explain in detail how will you measure phase and frequency using Lissajous pattern with the help of suitable exam.

Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech. (End- sem. 2016-17)**Branch:** Electrical and Electronics**Title of the course:** Electrical & Electronics Measurements**Semester:** 3rd**Course code:** EEB-202**Time:** 3 hours**Maximum Marks:** 50**Note :** 1. Answer all the Sections.

2. Attempt any 4 questions from section-B.
3. Attempt any two questions from section-C.
4. Do not write anything on the question paper except Roll number
5. Assume any data suitably if found missing

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