

Printed Pages: 4 426/428/450 NEE302/EEE302/EE304

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

Paper ID : 121322 /
121302 / 121314

Roll No.

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B. Tech.

(SEM. III) THEORY EXAMINATION, 2015-16

**ELECTRICAL MEASUREMENT & MEASURING
INSTRUMENTS**

[Time:3 hours]

[Total Marks:100]

Section A

1. Attempt **all** questions from the following : (10x2=20)
- (a) Differentiate between accuracy and precision.
 - (b) What limitations were overcome by modified De-Sauty's Bridge ?
 - (c) Give the range for measurement of low, medium and high resistance.
 - (d) What is the need of standardization of AC potentiometers ?
 - (e) 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 % and in ohms if the resistances are connected in series.

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- (f) Compare digital instruments with analog instruments.
- (g) Define burden of instrument transformers.
- (h) Discuss the advantage of Lloyd Fisher square over Epstein square.
- (i) Why the secondary of current transformer should never be open while the primary winding is energized ?
- (j) What Lissajous pattern will appear on screen when two equal voltages of equal frequency but with 90% phase displacement are applied to a CRO ?

Section B

Attempt **any five** questions from the section: (5x10=50)

- 2. (a) Explain the construction and working of electrodynamicometer type wattmeter.
- (b) What are the different sources of errors in electrodynamicometer type wattmeter ? How these errors can be corrected ?
- 3. (a) Discuss different detectors used in a.c. bridges. Enumerate different methods for the measurement of inductance.
- (b) Derive balance equation of Anderson's Bridge along with its phasor diagram. Mention advantages and disadvantages of this bridge.

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- 4. (a) Explain the concept behind digital measurements.
- (b) Describe the working of ramp type DVM with suitable diagram.
- 5. (a) Describe the construction and working of flux-meter.
- (b) Prove that the flux is proportional to the deflection of flux-meter.
- 6. (a) Describe various errors in energy meter. How are they eliminated ?
- (b) Explain why splitting is not necessary in this case while in single phase power factor meter phase splitting has to be done necessary by using R in one circuit and L in other circuit of moving coils.
- 7. (a) Describe how high currents and voltages are measured with the help of instrument transformers. Draw diagram to illustrate your answer.
- (b) Derive the expression for ratio and phase error in case of current transformer.
- 8. Describe the construction and working of Weston type frequency meter for the measurement of frequency.
- 9. (a) Explain the working of Cathode Ray Oscilloscope (CRO).
- (b) Discuss the differences between dual scope and dual beam CRO.

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Section C

Attempt **any two** questions from this section.(15x2=30)

10. (a) Distinguish between the null type and deflecting type of instruments. Cite examples to support your answer.
- (b) Discuss the role of null type instrument in the measurement of low range resistances.
- (c) Derive the condition for balance with suitable circuit diagram of Kelvin's Double bridge.
11. (a) Describe the construction and working of a polar type potentiometer.
- (b) What are the functions of transfer instrument and the phase shifting transformer ?
- (c) Explain how iron losses can be measured in a specimen through wattmeter method.
12. (a) Describe with phasor diagram, how capacitance can be measured by Schering bridge.
- (b) What is the concept behind digital measurement ? Draw the block diagram of Digital multimeter.

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