

Paper Id: 120309

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B. TECH
(SEM-III) THEORY EXAMINATION 2019-20
ELECTRICAL MEASUREMENTS AND MEASURING INSTRUMENTS

Time: 3 Hours

Total Marks: 100

Note: Attempt Section I first equianymously and then choose suitably.

S E C T I O N

1. Attempt 4 questions brief. 2 x 10 = 20

a.	Explain following term- Gross Error, Random Error.
b.	What are the differences between moving coil and moving iron instruments?
c.	How do instrument transformers differ from power transformer?
d.	How is an ac tachometer superior to dc tachometer?
e.	Name the difficulty associated with the measurement of high resistances.
f.	What are the factors which affect the measurement accuracy of Q-meter?
g.	Distinguish between dc and ac type potentiometers.
h.	What is ballistic galvanometer? Give the expression for the deflection of ballistic galvanometer in terms of its physical constants.
i.	What are the advantages of integrating type A/D converters over the non integrating type?
j.	What is meant by Harmonic distortion? What do you understand by total harmonic distortion?

SECTION B

2. Attempt any three of the following: 10x3=30

a.	Compare a moving coil type of velocity transducer with a moving magnet type of velocity transducer on the following points: i. Construction ii. Operation and iii. Relative merits and demerits.
b.	Describe the method of measuring inductance using Maxwell's inductance bridge on following points: i. Circuit Diagram ii. Phasor diagram iii. Derivation of formula
c.	Describe construction and working of electrodynamic type voltmeter.
d.	Explain A.C. wattmeter method for determination of iron loss of test specimen of iron piece.
e.	How many types of digital Voltmeters are there? Explain the integrating type of digital voltmeter. What are its specific advantages

SECTION C

3. Attempt any one part of the following: 10x1=10

a.	i. Explain the various operating torques in an energy meter. ii. Explain the causes and remedies of the errors occurring in a wattmeter
b.	Explain the term "Standard" in measurement system. Also mention the various types of standard used in industry.

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4. Attempt any one part of the following: 10x1=10

a.	Draw an equivalent circuit and phasor diagram of potential transformer (PT). Derive the expression for its ratio and phase angle errors.
b.	Explain the working of a electrical resonance type frequency meter. Draw the phasor diagram under different power factor conditions.

5. Attempt any one part of the following: 10x1=10

a.	The four arms of a bridge network are made up as follows. Arm AB – a resistor of 40 ohm in parallel with an inductor of 0.1 H. Arm BC – a resistor of 120 ohm Arm CD - a unknown resistor R in parallel with unknown capacitor C. Arm DA – a resistor of 1000 ohm. A 50 hz voltage supply is applied across A and C. Find R and C when vibration galvanometer connected across B and D is undeflected.
b.	What precautions are taken while measuring low resistance? Explain the reason how a Kelvin's double bridge measures low resistances without error.

6. Attempt any one part of the following: 10x1=10

a.	How unknown e.m.f is measured using Drysdale-Tinsley AC potentiometer.
b.	Draw BH Curve, how B-H curve is determined using method of reversals?

7. Attempt any one part of the following: 10x1=10

a.	Draw and explain the circuit of different types of digital frequency meter.
b.	A voltmeter uses $3\frac{1}{2}$ digit display. i. Find its resolution. ii. How would the 11.87 V be displayed on a 10 V range? iii. How would the 0.5573 be displayed on 1 V and 10 V ranges