Paper Id: | 120302 | Roll No: | | | | | | | | | | | | | |

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

Time: 3 Hours   *Total Marks: 70*

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

SECTION A

1. **Attempt *all* questions in brief.**   **2 x 7 = 14**

a.	What is meant by limiting error?
b.	What are the differences between moving coil and moving iron instruments?
c.	What is meant by dissipation factor of a leakage capacitor?
d.	How do instrument transformers differ from power transformer?
e.	Compare digital instruments with analog instruments.
f.	What is piezoresistive effect in Transducer?
g.	Explain Thompson effect in thermocouple?

SECTION B

2. **Attempt any *three* of the following:**   **7 x 3 = 21**

a.	i. Explain the various operating torques in an energy meter. ii. Explain the term "Standard" in measurement system. Also mention the various types of standard used in industry.
b.	i. Explain the measurement of high resistance using loss of charge method. ii. Derive the equation of balance for modified De Sauty Bridge. Draw the phasor diagram for balance condition.
c.	A current transformer with a bar primary has 200 turns in its secondary winding. The resistance and reactance of secondary circuit are 2.5 Ω and 1 Ω respectively including transformer winding .with 4 Amp flowing in secondary winding. The magnetizing MMF is 120 Amp turn and iron loss is 1.2 Watt. Find transformation ratio R and phase angel error ω .
d.	Sketch the CRT with internal structure & explain its different components in detail.
e.	Derive expression for gauge factor of strain gauge ,A resistance strain gauge with gauge factor 2 is fastened to steel subjected to stress 500 kg/sq. cm .if modulus of elasticity of steel is $2 *10^6$ kg/ cm^2 ,calculate change in resistance if strain gauge element applied due to applied stress.

SECTION C

3. **Attempt any *one* part of the following:**   **7 x 1 = 7**

(a)	Explain static & dynamic characteristics of instruments.
(b)	What are the different types of error occur in the measuring instrument?

4.   **Attempt any *one* part of the following:**   **7 x 1 = 7**

(a)	Explain working principle of Kelvin's double bridge for measurement of low resistance.
(b)	Describe the method of measurement of capacitance using Wien's bridge with the help of circuit diagram, phasor diagram and derivation of formula. How can frequency are measured by this bridge.

5.   **Attempt any *one* part of the following:**   **7 x 1 = 7**

(a)	Draw an equivalent circuit and phasor diagram of potential transformer. Derive the expression for its ratio.
(b)	Why secondary of current transformer never open while its primary winding is energized. Write down application of current transformer.

6.   **Attempt any *one* part of the following:**   **7 x 1 = 7**

(a)	Write short notes on (a) Digital Frequency Meter (b) Digital voltmeter.
(b)	Draw the block diagram of Digital counter Timer & explain its working .write advantages of digital meter over analog meter.

7.   **Attempt any *one* part of the following:**   **7 x 1 = 7**

(a)	Describe the working principle, construction and application of hall effect transducer.
(b)	With the help of neat sketch & explain the working of Ultrasonic flow meter, Electromagnetic Flow meter.