Printed pages: 2 **Sub Code: EEE-302**

Paper ID: 2019 **Roll No.** | | | | | | | | | | |

B.TECH
(SEM III) THEORY EXAMINATION 2017-18
ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS

Time: 3 Hours **Total Marks: 100**

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

SECTION A

1. Attempt all questions in brief. **2 x10 = 20**

a. Distinguish between direct and indirect measurement.
b. What do you mean by sensitivity and accuracy for dynamic measurement?
c. Explain the burden of current transformer.
d. Explain disadvantage of shunts and multipliers when used for extension of range.
e. What are the difficulties in measurement of high resistance?
f. What are sources of error in ac bridge circuits?
g. Explain the term standardization of a potentiometer.
h. What is the principle of working of flux meter?
i. What are the advantages of digital indicating instruments over analog instruments?
j. Explain delayed sweep in CRO.

SECTION B

2. Attempt any three of the following: **10 x 3 = 30**

a. Explain construction and working of PMMC instruments. Derive the equation for deflection torque. Also explain its advantage and disadvantage.
b. Draw and explain the equivalent circuit and phasor diagram of a current transformer. Derive the relation for ratio and phase angle errors.
c. Explain different method of capacitive measurement in detail.
d. Describe the construction and working of a polar type potentiometer. What are the functions of the transfer instrument and phase shifting transformer?
e. Explain dual trace and dual beam type oscilloscope with neat and clean diagram.

SECTION C

3. Attempt any two parts of the following: **5 x 2 = 10**

(a) What are the basic blocks of generalized instrumentation system? Draw the various blocks and explain their functions
(b) A flow meter is calibrated from 0 to 100 m^3/s. The accuracy is specified as within $\pm$ 0.75% above 20% of scale reading. What is static error if the instrument indicate 80 m^3/s.
(c) Explain electrodynamometer instrument and derive its torque equation.

4. Attempt any two parts of the following: **5 x 2 = 10**

(a) What is the difference between CT and PT. Explain the characteristic and application of potential transformer?
(b) Explain the construction and working of Ratio meter type frequency meter.
(c) Explain moving iron power factor meter its advantage and disadvantages.

5. Attempt any two parts of the following: 5 x 2 = 10

(a) The four arms of a Wheatstone bridge are as follows:
AB=100Ω, BC= 1000 Ω, CD= 4000 Ω and DA= 400 Ω
The galvanometer has a resistance of 100 Ω, a sensitivity of 100mm/μA and is connected across AC . A source of 4 V d.c. is connected across BD. Calculate the current through the galvanometer and its deflection if the resistance of arm DA is changed from 400 Ω to 401 Ω.

(b) Explain Kelvin's double bridge method for the measurement of low resistance.

(c) Explain Anderson bridge method of inductance measurement with its circuit and phasor diagram.

6. Attempt any two parts of the following: 5 x 2 = 10

(a) The power is measured by with an A.C. potentiometer. The voltage across a 0.1Ω standard resistance connected in series with load is 0.35-j0.10 V. The voltage across 300:1 potential divider connected to the supply is 0.8+j0.15V. Determine the power consumed by the load and power factor.

(b) Explain bridge method for the measurement of iron loss.

(c) Give the construction and working of a flux meter.

7. Attempt any two parts of the following: 5x2= 10

(a) Explain the working principle of an Ramp- type digital voltmeter (DVM) With suitable diagram.

(b) Explain total harmonic distortion and describe the working of harmonic distortion analyzer with block diagram.

(c) How CRO can be used for frequency and phase displacement measurement?