Q.P. Code: 16EE224 **R16**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech III Year II Semester Regular Examinations May 2019

ELECTRICAL AND ELECTRONIC MEASUREMENTS

(EEE)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1 **a** With neat sketch explain the working of an EDM type ammeter and derive the torque equation. 6M

b Design a multi range ammeter with the ranges of 1 A, 5 A, 25 A and 125 A employing individual shunts in each case when a D'Arsonoval movement with an internal resistance of 730 Ω and assume full scale current of 5 mA. 6M

OR

2 **a** With neat sketch explain the construction and working of attraction type MI instrument. 6M

b With appropriate expressions, analyze and discuss the procedure to extend the range of DC ammeter and voltmeter in detail. 6M

UNIT-II

3 **a** Describe the method of measurement of low resistance using Kelvin's double Bridge. 6M

b The four arms of a Wheatstone bridge are as follows:
Arm AB=100 Ω; BC=10 Ω; CD=4 Ω; DA=50 Ω. The galvanometer has a current sensitivity of 10 mm/μA and an internal resistance of 100 Ω and is connected across BD. A source of 10 V with negligible resistance DC is connected across AC. Find the deflection of galvanometer and sensitivity of the bridge in terms of deflection per unit change in resistance. 6M

OR

4 **a** Explain the working of Hay's bridge for measurement of inductance with a circuit diagram. Derive the equations under balanced conditions and draw it's phasor diagram. 6M

b Draw the circuit and phasor diagram of Anderson's bridge under balanced conditions. Also, derive the expression under balanced conditions for unknown inductance. 6M

UNIT-III

5 **a** Prove that the

$$truepower = \frac{\cos\varphi}{\cos\beta\cos(\varphi-\beta)} * actual \quad wattmeter \quad reading$$

for an electrodynamometer type of wattmeter. 7M

b The meter constant of 230V, 10A energy meter is 1700. The meter is tested under half load and rated voltage at unity p.f. The meter is found to make 80 revolutions in 138 sec. Find it's % of error. 5M

OR

6 **a** Derive the torque equation of an electrodynamometer type wattmeter and comment on the shape of the scale of wattmeter. 6M

b A dynamometer wattmeter is used to measure the power factor of a 20μF Capacitor. The pressure coil of the wattmeter having a resistance 1000Ω and an inductive reactance of 15Ω is connected across a 50Hz supply. The current coil of the wattmeter, a variable resistor R and the capacitor are connected in series across the same supply. The wattmeter deflection is made zero by adjusting the value of R to 1.65Ω. If the current coil resistance is 0.1Ω and its inductance is negligible. Determine the power factor of the capacitor. 6M

UNIT-IV

7 **a** Describe with the help of suitable diagrams how a DC potentiometer can be used for the calibration of an ammeter and voltmeter? 6M

b Measurements for the determination of the impedance of a coil were made on a co-ordinate potentiometer and are as follows:
i) Voltage across a 1 Ω standard resistance in series with the coil is a (0.952- j0.34) V.
ii) Voltage across a 100:1 potential divider connected to the terminals of the coil is (0.135+j0.1128) V. Calculate the resistance and inductance of the coil. 6M

OR

8 **a** Derive the expression for ratio error and phase angle error of PT. 6M

b Explain different types of errors of CT and PT, and discuss its preventives. 6M

UNIT-V

9 **a** Prove that is a Ballistic galvanometer, the charge is proportional to first swing of the moving coil. 6M

b With neat sketch explain construction & working of flux meter. 6M

OR

10 **a** Describe briefly how the following measurements can be made with the use of CRO.
(i) Frequency
(ii) Phase Angle
(iii) Voltage 6M

b Explain building blocks and characteristics of digital meters 6M

*** END ***