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

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech III Year II Semester Supplementary Examinations Dec 2019

ELECTRICAL AND ELECTRONIC MEASUREMENTS

(Electrical & Electronics Engineering)

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 PMMC instrument. Derive the torque equation of PMMC instrument.	**6M**
	b	A MC instrument gives a full scale deflection of 10 mA when the potential difference across its terminals is 100 mV. Calculate the shunt resistance for a full scale deflection corresponding to 100 A and the series resistance for full scale reading with 1000 V. Calculate the power dissipation in each case.	**6M**

OR

2	a	Discuss about various types of errors and compensations of measuring instruments.	**6M**
	b	A 10 A electrodynamometer is controlled by a spring having a torsion constant of 0.1×10^{-6} N-m/degree. The full scale deflection is 110^0. Determine the inductance of the instrument when measuring a current of 10 A. The mutual inductance at 0^0 deflection is 2 μH.	**6M**

UNIT-II

3	a	The value of high resistance is measured by loss of charge method. A capacitor having a capacitance of 2.5 μF is charged to a potential of 500 V DC and is discharged through the high resistance. An electrostatic voltmeter kept across the high resistance, reads the voltage as 300 V at the end of 60 sec. Calculate high value of resistance.	**6M**
	b	Classify the different types of DC bridges based on resistance value and explain the Wheatstone bridge for the unknown value of resistance with neat sketch.	**6M**

OR

4	a	Explain the working of Maxwell's inductance and capacitance bridge for measurement of inductance with a circuit diagram. Derive the equations under balanced conditions and draw it's phasor diagram.	**6M**
	b	With the help of circuit diagram determine the unknown capacitance using Schering bridge under balanced condition and draw it's phasor diagram.	**6M**

UNIT-III

5	a	Discuss the errors and their compensations in the dynamometer type wattmeter.	**6M**
	b	A wattmeter has a current coil of 0.03 Ω resistance and a pressure coil of 6000 Ω resistance. Calculate the percentage error (i) if the wattmeter current coil is connected on the load side; (ii) if the wattmeter pressure coil is connected on the load side. (a) If the load takes 20 A at a voltage of 220 V and 0.6 p.f in each case; (b) At which load current will give equal errors with the two connections?	**6M**

OR

6	a	With neat sketch explain construction and working of a single phase induction type energy meter.	**6M**
	b	Discuss the errors and compensations in Energy meters.	**6M**

UNIT-IV

7	a	Describe with the help of suitable diagrams how a DC potentiometer is used for the measurement of unknown resistance and unknown current?	6M
	b	A Crompton's potentiometer consists of a resistance dial having 15 steps Of 10 Ω each and a series connected slide wire of 10 Ω which is divided into 100 divisions. If the working current of the potentiometer is 10 mA and each division of slide wire can be read accurately up to 1/5 of its span. Calculate the resolution of the potentiometer in volts.	6M

OR

8	a	Derive the expression for ratio error and phase angle error of CT.	6M
	b	Explain the construction, operation & characteristics of potential transformer	6M

UNIT-V

9	a	Derive equation of motion of Ballistic galvanometer.	6M
	b	A ballistic galvanometer has a free period of 10 seconds and gives a steady deflection of 200 divisions with a steady current of 0.1 mA and a charge of 121 μC is instantaneously discharged through the galvanometer giving rise to a first maximum deflection of 100 divisions. Calculate the decrement of the resulting oscillations.	6M

OR

10	a	With the help of neat sketch explain the working of each block in CRO.	6M
	b	Explain the working of digital meters with neat sketch.	6M

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