Final: 07.01.2022

Course Code: 1950210 **Roll No:** **MLRS- R19**

MARRI LAXMAN REDDY
INSTITUTE OF TECHNOLOGY AND MANAGEMENT
(AN AUTONOMOUS INSTITUTION)
(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)
Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section2(f) & 12(B)of the UGC act,1956

III B.Tech I SEM Regular End Examination, January 2022

Measurements and Instrumentation

(EEE)

Time: 3 Hours. **Max. Marks: 70**

Note: 1. Question paper consists: Part-A and Part-B.
2. In Part – A, answer all questions which carries 20 marks.
3. In Part – B, answer any one question from each unit.
Each question carries 10 marks and may have a, b as sub questions.

PART- A

(10*2 Marks = 20 Marks)

1.	a)	Why do we use a multiplier with a voltmeter?	CO1	BL1
	b)	Why is damping required for an electromechanical measuring instrument?	CO1	BL1
	c)	Why is secondary of a CT is never left open circuited?	CO2	BL1
	d)	A potentiometer is standardized using a known voltage of 2V by keeping the slide wire at 50cm position of the scale. The total length of the scale is 2meters. Find the unknown battery voltage which is balanced at 150cm.	CO2	BL3
	e)	What is creeping error? How is it prevented.	CO3	BL1
	f)	What is meant by phantom loading?	CO3	BL1
	g)	Draw a suitable AC bridge used for measurement of frequency.	CO4	BL1
	h)	Why Maxwell bridge is limited to the measurement of medium–Q coils?	CO4	BL1
	i)	Define gauge factor of a strain gauges. How is related to positions ratio μ.	CO5	BL1
	j)	What do you mean by active and passive transducer? Give suitable examples.	CO5	BL1

PART- B

(10*5 Marks = 50 Marks)

2	a)	Explain the construction and working of an attracted disc type Kelvin absolute electrometer	5M	CO1	BL4
	b)	Derive the expression for the Extension range of ammeter and series voltmeter.	5M	CO1	BL4
		OR			
3		Describe the constructional details and working of a moving iron attraction type meter. Derive its torque equation. Draw the relevant figures.	10M	CO1	BL2
4	a)	Draw the circuit diagram of Crompton's D.C potentiometer and explain the principle of operation.	5M	CO2	BL4
	b)	A Maxwell's capacitance bridge is used to measure an unknown inductance in comparison with capacitance. The various values at balance R_2=400Ω, R_3=600Ω, R_4=1000Ω, C_2=0.5μF. Calculate the	5M	CO2	BL3

values of R_1 & L_1 and also calculate the value of storage factor(Q) of coil frequency is 1000Hz.

OR

5		Draw the equivalent circuit and phasor diagram of a potential transformer and derive the expression for actual transformation ratio and phase angle.	10M	CO2	BL4
6	a)	Explain how power in high voltage circuits is measured using instrument transformer?	5M	CO3	BL4
	b)	A single phase energy meter makes 500 revolutions per kwh. It is found on testing as making 40 revolutions in 58.1 sec at 5 kw full load. Find out the percentage error.	5M	CO3	BL3

OR

7		Derive the torque equation for an electrodynamometer type wattmeter and write its working principle and operation.	10M	CO3	BL6
8	a)	Describe in brief the different methods used for measurement of medium resistance.	5M	CO4	BL2
	b)	Describe how relative permittivity of a specimen of insulating material can be determined using a Schering bridge.	5M	CO4	BL2

OR

9		Explain the working of Hay's bridge for measurement of inductance with a circuit diagram. Derive equation for balance and draw the phasor diagram under balance condition.	10M	CO4	BL4
10	a)	What are the differences between thermocouple and thermistor?	5M	CO5	BL2
	b)	Explain the input and output characteristics of transducers?	5M	CO5	BL4

OR

11		Define strain gauge. Classify and explain electrical strain gauges.	10M	CO5	BL4

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