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Third Semester B.E./B.Tech. Degree Examination, June/July 2025
Electrical Measurements and Instrumentation

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	What is measurement? Explain the classification of instruments.	10	L1	CO1
	b.	Explain the different types of error in measurements and discuss on how the errors in measurement can be reduced.	10	L2	CO1
		OR			
Q.2	a.	With block diagram, explain the elements of generalized measurement system. State any example.	10	L2	CO1
	b.	With block diagram, explain the I/O configuration in measuring system.	10	L2	CO1
		Module – 2			
Q.3	a.	Explain the wheat Stone Bridge for medium Resistance measurement. i) Derive the expression for unknown Resistance under balanced condition. ii) What is Bridge sensitivity? Derive the expression for same.	10	L3	CO1
	b.	A wheat stone bridge has ratio arms of 1000Ω and 100Ω to measure resistance of 50Ω. Two galvanometers are available to be used as detectors. Galvanometer A has a, resistance of 100Ω and a sensitivity of 400 mm/μ_A. Galvanometer B has a resistance of 1000Ω and a sensitivity of 800 mm/μ_A. Find out which of two galvanometers is more sensitive to a small imbalance.	10	L3	CO2
		OR			
Q.4	a.	With a suitable bridge configuration, explain the anderson's bridge to measure unknown inductance and derive the expression for same.	10	L2	CO2
	b.	The four arms of a Derauty bridge are as follows: Arm AB : capacitor C_1 with resistance r_1 Arm BC : non-inductive resistor R_3 Arm CD: non-inductive resistor R_4 Arm DA : capacitor C_2 with resistance r_2 in series with standard resistance R_2. An AC supply at 500Hz is applied across A and C, detector in between B and D. At Balance $R_2 = 5\Omega$, $R_3 = 3000\Omega$, $R_4 = 2800\Omega$, $C_2 = 0.6\ \mu F$, $r_2 = 0.5\Omega$. Find the values of C_1, r_1 and dissipation factor.	10	L3	CO2
		Module – 3			
Q.5	a.	List the advantages of instrument transformer and explain the types of errors in current transformer.	10	L2	CO3
	b.	At its rated load of 25 VA, a 100/5 A current transformer has an iron loss of 0.2 w and a magnetizing current of 1.5 A. Calculate the ratio error and phase angle when supplying rated output to a meter having a ration of resistance to reactance of 5.	10	L3	CO3

		OR			
Q.6	**a.**	Give the comparison between current and potential transformer.	**05**	**L2**	**CO3**
	b.	Briefly explain the characteristics of potential transformer.	**05**	**L1**	**CO3**
	c.	With a neat diagram, explain how to measure magnetizing force.	**10**	**L2**	**CO3**
		Module – 4			
Q.7	**a.**	With a block diagram, explain the true RMS reading voltmeter.	**10**	**L2**	**CO4**
	b.	With a block diagram, explain the RAMP type DVM.	**10**	**L2**	**CO4**
		OR			
Q.8	**a.**	What is Q-meter? Explain how the low impedance components can be measured, derive the expressions for the same.	**10**	**L2**	**CO4**
	b.	With a block diagram, explain the working of electronic energy meter.	**10**	**L2**	**CO4**
		Module – 5			
Q.9	**a.**	With a diagram, explain the principle of operation of LCD display. State any two advantages and two disadvantages.	**10**	**L2**	**CO4**
	b.	Write a short note on: i) Nixie Tube ii) Incandescent and Flourescent lamp.	**10**	**L2**	**CO4**
		OR			
Q.10	**a.**	With a block diagram, explain the potentiometric type recorder.	**10**	**L2**	**CO4**
	b.	With a block diagram, explain the X – Y type recorder.	**10**	**L2**	**CO4**

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