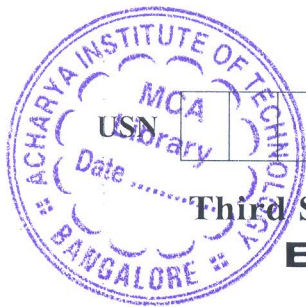


# CBCS SCHEME



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BEE306B

## Third Semester B.E./B.Tech Degree Examination, June/July 2024 Electrical Measurement 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.	State the primary objective of measurement systems and enumerate three categories of instrumentation systems.	10	L2	CO1
	b.	Explain the importance of input-output configurations in measuring instruments.	10	L2	CO1
<b>OR</b>					
Q.2	a.	Identify three groupings of instruments based on their functions.	10	L2	CO1
	b.	Explain the importance of accuracy and precision in measurements.	10	L2	CO1
<b>Module – 2</b>					
Q.3	a.	Explain the concept of galvanometer sensitivity and its significance in the measurement of electrical currents.	6	L2	CO2
	b.	Explain the working principle of the wheat stone bridge and how the balanced state helps eliminate potential sources of error in resistance measurements.	6	L2	CO2
	c.	In a wheat stone bridge, the resistance of various arms are $P = 1000\Omega$ , $Q = 100\Omega$ $R = 2005\Omega$ and $S = 200\Omega$ . The battery has an emf of 5V and negligible internal resistance. The galvanometer has a current sensitivity of $10\text{mm}/\mu\text{A}$ and an internal resistance of $100\Omega$ . Calculate the deflection of the galvanometer and a sensitivity of the bridge in terms of deflection per unit change of resistance.	8	L3	CO2
<b>OR</b>					
Q.4	a.	Explain the working principle of the De = sauty bridge in measuring the capacitance of a capacitor.	8	L2	CO2
	b.	Explain the Wagner's Earth connection with a neat diagram.	8	L2	CO2
	c.	Enumerate the reasons for shielding of bridges.	4	L2	CO2
<b>Module – 3</b>					
Q.5	a.	Illustrate the construction of a current transformer through a labelled diagram and generate an equivalent circuit to demonstrate equivalent circuit to demonstrate its operational principles.	12	L2	CO3
	b.	A current transformer has a bar primary and 300 turns. The secondary supplies a current of 5A to a non-inductive burden of $2\Omega$ . The primary exciting ampere-turns are 100. The frequency of the supply is 50Hz. The net cross seminal area of the core is $12\text{cm}^2$ . Calculate the actual ratio and phase angel of the current transformer. Neglect iron loss and copper loss.	8	L3	CO3
<b>OR</b>					
Q.6	a.	Enumerate the difference between C.T and P.T.	4	L2	CO3
	b.	Explain with a neat diagram to measure the magnetic flux or flux density.	8	L2	CO3
	c.	The exciting current of a C.T is 2A logging $40^\circ$ to the secondary voltage reversed. The C.T has a bar primary and a nominal ratio of 100/1A. The external burden is $1.5\Omega$ and the resistance of the secondary winding is $0.25\Omega$ . When 1A of current is flowing through the secondary winding, calculate the actual ratio of C.T and its phase angle.	8	L3	CO3

## Module – 4

Q.7	a.	Explain with a neat block diagram, vane-type true RMS voltmeter.	8	L2	CO4
	b.	Explain with a neat diagram, how “Q” meter can be used to measure the electrical properties of inductive coils and capacitors.	8	L2	CO4
	c.	Enlist the errors that occur during the measurement of ‘Q’ factor of a component.	4	L2	CO4

## OR

Q.8	a.	Enumerate the advantages of electronic instruments over ordinary conventional measuring instruments.	8	L2	CO4
	b.	With a neat block diagram, explain the working of electronic energy meter. Enlist the extra features offered by present day meters.	12	L2	CO4

## Module – 5

Q.9	a.	Explain with a neat diagram, the working of : i) Segment display ii) Dot matrix displays.	10	L2	CO4
	b.	Write short notes on : i) LED display ii) Liquid Crystal Displays (LDC display).	10	L2	CO4

## OR

Q.10	a.	Explain with a neat diagram, the working of LVDT type recorder.	10	L2	CO4
	b.	Write short notes on : i) x-y recorders ii) Magnetic tape recorders.	10	L2	CO4

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