CBCS SCHEME

USN | | | | | | | | | |

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
		OR			
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
		Module – 2			
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 = 1000Ω, Q = 100Ω R = 2005Ω and S = 200Ω. The battery has an emf of 5V and negligible internal resistance. The galvanometer has a current sensitivity of 10mm/μA and an internal resistance of 100Ω. Calculate the deflection of the galvanometer and a sensitivity of the bridge in terms of deflection per unit change of resistance.	8	L3	CO2
		OR			
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
		Module – 3			
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 2Ω. The primary exciting ampere–turns are 100. The frequency of the supply is 50Hz. The net cross seminal area of the core is 12cm^2. Calculate the actual ratio and phase angel of the current transformer. Neglect iron loss and copper loss.	8	L3	CO3
		OR			
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° to the secondary voltage reversed. The C.T has a bar primary and a nominal ratio of 100/1A. The external burden is 1.5Ω and the resistance of the secondary winding is 0.25Ω. 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, vamp-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

* * * * *