

	wattmeter in ac and dc signals? Explain your solution.	8
4.	Write short notes on any TWO: a) Ballistic galvanometer b) Extension of range of instruments c) Electromagnetic damping	2x8=16
5.	a) Prove that the deflection of a moving iron instrument is proportional to the true rms value of the waveform applied to its coil.	8
	b) Derive an expression of the ratio error and phase error of a current transformer.	8

B.E.E.(EVENING) 2ND YEAR 1ST SEMESTER EXAMINATION, 2024**SUBJECT: - ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS**

Time: Three hours

Full Marks 100
(50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	PART-II	Marks
Answer any 3, 2 marks for well-organized answers (16 X 3 + 2 = 50)		
1.	Justify and/or correct the following statements with proper explanations (any four):	(4X4=16)
a)	<i>Gauge factor</i> and <i>Transverse sensitivity</i> of strain gauges should be as high as possible.	
b)	Series and Shunt type ohmmeters can be identified from their scales.	
c)	Scale of the Megger is cramped towards the higher values of resistance.	
d)	Low resistances are made with four terminals.	
e)	Dummy gauges are used to increase sensitivity of measurement in Wheatstone bridge method based strain measurement	
2. a)	Explain the steps of standardizing of a laboratory type DC potentiometer with proper circuit diagram.	6
b)	A Crompton potentiometer has 18 step coarse dial where each step represents 0.1 V and each step resistance is 20 ohm. The fine dial is total 10 ohm with 100 divisions. Find the measuring range and resolution of the potentiometer. How can you make this into dual range potentiometer (namely X1, X0.1) by connecting two resistances parallel to the total dial resistance? Derive necessary relations.	4+6
3. a)	Is it possible to obtain the B-H loop of a specimen of magnetic material using a ballistic galvanometer in the measuring circuit? Explain with necessary diagrams and calculations.	10
b)	In magnetic loss test of a specimen of magnetic material of total weight 10 kg, the measured values of iron loss at a given peak flux density were 36 watt at 40 Hz and 78 watt at 60 Hz. Estimate hysteresis and eddy current losses in Watt/kg at 50 Hz for the same peak flux.	6
4. a)	Calculate the bridge sensitivity for Wheatstone bridge based strain measurement using two active resistance strain gauges.	6
b)	A series type ohmmeter has a moving coil system with full-scale current of 10 mA and 100 ohm resistance. The current limiting series resistance is 1 kohm. Find the minimum and maximum value of shunt resistance for proper zero adjustment when the battery varies between 31 V and 21 V.	5
c)	Describe the method for measuring capacitance and loss angle of a capacitor using Schering bridge with necessary circuit diagram.	5
5.	Write short notes on <i>any two</i>	2X8=16
a)	Cold junction compensation for thermocouple circuits	
b)	Price's Guard wire method for measurement of insulation resistance	
c)	Separation of iron loss using Lloyd Fisher Square	