MORNING

12 MAY 2023

Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.		
[Total No. of Questions: **09**]		[Total No. of Pages: **02**]
Uni. Roll No.		
Program: **B.Tech. EE (Sem. 5th)**		
MEASUREMENT and INSTRUMENTATION		
Subject Code: **PCEE-112**		
Paper ID:**16464**		
Scientific Calculator is allowed		
Time Allowed: 03 Hours		**Max. Marks: 60**
Note:		
1)	**Parts A and B are compulsory**	
2)	**Part C** has two questions **Q8** and **Q9**. Both are compulsory, but with internal choice.	
3)	Any missing data may be assumed appropriately	
	Part – A	**[Marks: 02 each]**
Q1.		
	a)	Define static sensitivity of an instrument. Also mention its unit.
	b)	State any **two** differences between null type and deflection type instruments.
	c)	Draw a labeled diagram depicting hysteresis loop.
	d)	Mention any **two** transducers each for measurement of level and flow.
	e)	How one can measure a current flowing through a live conductor without breaking the circuit?
	f)	Full form of RTD and LVDT. What is their use?
	Part – B	**[Marks: 04 each]**
Q2.	Can Galvanometer be used as a voltmeter and ammeter? If yes then explain with the diagram.	
Q3.	A voltmeter having a sensitivity of 1000Ω/V reads 100Von its 150V scale when connected across an unknown resistor in series with a milli-ammeter. When the milli-ammeter reads 5mA, calculate: a) apparent resistance of the unknown resistor b) actual resistance of the unknown resistor and c) error due to loading effect of the voltmeter.	
Q4.	Draw a low voltage Schering bridge. Derive the equations for capacitance and dissipation factor.	
Q5.	Enlist different types of control systems used in analog instruments. With a suitable diagram explain any **two.**	
Q6.	What is the need of an instrumentation system. Draw the block diagram showing the functional elements of a typical instrumentation system.	

Q7.	Explain the construction and operation of flux meter.
	Part – C **[Marks: 12 each]**
Q8.	Draw the equivalent circuit and phasor diagram of a current transformer. Derive the expressions for its ratio and phase angles. **OR** What is meant by CRO? Explain how we can measure frequency of a signal and phase angle between two waveforms by using this instrument.
Q9.	What is the principle of strain gauge?. Derive the expression for a Guage factor of a given wire when stress ***'s'*** is applied to it. The wire has the following dimensions: Length=L, Area of cross-section=A, Diameter =D, before being strained. The material of the wire has a resistivity=ρ.
	OR
	Diagrammatically explain the constructional details of Electrodynamometer type wattmeter. Also derive the torque equation. Draw a Wein Bridge? Write the expression for frequency to be calculated.

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