II B. Tech II Semester Regular Examinations, August/September - 2021
ELECTRICAL MEASUREMENTS & INSTRUMENTATION
(Electrical and Electronics Engineering)

Time: 3 hours   Max. Marks: 75

Answer any **FIVE** Questions each Question from each unit
All Questions carry **Equal** Marks
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1	a)	Explain the following control mechanisms used in indicating instruments: i) Gravity control ii) Spring control	[8M]
	b)	Explain the working of Repulsion type of Moving iron instrument with a neat diagram.	[7M]

Or

2	a)	Explain the construction and working of a current transformer with a neat equivalent circuit.	[7M]
	b)	A PMMC instrument has a coil of dimensions 15mmx12mm. The flox density in the air gap is $1.8x10^{-3}$ wb/m2 and the spring constant is $0.14x10^{-6}$Nm/rad. Determine the number of turns required to produce an angular deflection of 90 degrees. When a current of 5mA is flowing through the coil.	[8M]
3	a)	List and explain the various sources of errors in Electrodynamometer instruments and how to mitigate them	[8M]
	b)	A wattmeter has a current coil of 0.03Ω resistance and a pressure coil of 6000 Ω resistance. Calculate the percentage error if the wattmeter is so connected that: i) the current coil is on the load side, ii) The pressure coil is on the load side. If a load takes 20 A at a voltage of 220V and 0.6 power factor in each case.	[7M]

Or

4	a)	Explain the working of Three-phase electrodynamometer type power factor with a neat diagram	[8M]
	b)	Explain the constructional details of an Electrodynamometer type wattmeter and also explain why it is necessary to make the potential coil circuit purely resistive?	[7M]
5	a)	Explain the loss of charge method for measurement of insulation resistance of the cables.	[8M]
	b)	The four arms of a wheat stone bridge are as follows AB=100 Ω, BC=10 Ω, CD=4 Ω and DA=50 Ω. The galvanometer has a resistance of 20 Ω and is connected across BD. A source of 10v d.e is connected across AC. Find the current through the galvanometer. What should be the resistance is the arm DA for no current through the galvanometer.	[7M]

Or

6	a)	Explain the working of Hay's bridge for measurement of inductance and derive the necessary equation under balanced condition.	[8M]
	b)	Explain the working of Wagner Earth device and give its significance.	[7M]
7	a)	Explain the following: i)Inductive transducers ii) Ther mistors.	[8M]
	b)	What is a Hall effect Sensors and give its advantages and disadvantages.	[7M]

Or

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8 a) What is a Strain Gauge and explain the theory behind it with respect to the change in dimensions. [8M]

   b) A strain gauge is bonded to a beam 0.2 m long and has a cross sectional area 4 cm^2. Young's modulus for steel is 220 GN/m^2. The strain gauge has an unstrained resistance of 250 Ω and a gauge factor of 2.4. When a load is applied, the resistance of gauge changes by 0.015Ω. Calculate the change in length of the steel beam and the amount of force applied to the beam. [7M]

9 a) Explain the working of Integrating type digital Voltmeter with a neat block diagram [8M]

   b) Explain the main parts of a cathode ray tube [7M]

Or

10 a) Explain the working of a Digital Energy meter with a neat block diagram [8M]

   b) Explain how phase and frequency can be measured by Lissajous patterns [7M]