GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY, ODISHA, GUNUPUR
(GIET UNIVERSITY)
B. Tech (Third Semester - Regular) Examinations, November – 2024
23BECPC23002 – Electronic Measurements and Instrumentation
(ECE)

Time: 3 hrs   Maximum: 60 Marks

Answer ALL questions
(The figures in the right-hand margin indicate marks)

PART – A   **(2 x 5 = 10 Marks)**

		CO #	Blooms Level
Q.1.	Answer *ALL* questions		
a.	Define Discrete-State Process Control and with a neat diagram.	CO2	K5
b.	Determine the resolution of a moving coil voltmeter having a uniform scale with 40 divisions; the full-scale reading is 40V and 1/10th of a scale division can be estimated with a fair degree of certainty.	CO1	K3
c.	Why is platinum typically preferred for industrial resistance thermometers? Provide the reasons.	CO1	K2
d.	List the advantages of using an electrodynamometer over a moving coil instrument.	CO2	K1
e.	When the bridge is balanced, how much current flows through the galvanometer? State the reasons.	CO4	K2

PART – B   **(10 x 5 = 50 Marks)**

Answer *ALL* the questions

		Marks	CO #	Blooms Level
2. a.	Describe the working of Maxwell's inductance-capacitance bridge for measurement of inductance with a suitable diagram.	5	CO1	K2
b.	The inductance of a moving-iron ammeter is given by the expression: $$L = (12 + 5\theta - 2\theta^2)\mu H$$ where θ is the angular deflection in radians from zero position. Determine (*i*) The spring constant (*ii*) The angular deflection in radians for a current of 10A if the deflection for a current of 5A is 30°.	5	CO3	K1
	(OR)			
c.	Briefly explain the working principle of a D'Arsonval Galvanometer with a neat diagram.	5	CO2	K3
d.	Prove the sum of the readings of the two wattmeters give the total power consumption in 3-phase load.	5	CO3	K2
3. a.	State Discrete-State variables with a level control mechanism.	5	CO4	K4
b.	A variable dielectric capacitive displacement sensor consists of two square metal plates, side 5cm, separated by a gap of 1mm. A sheet of dielectric material 1mm thick and the same area as the plates can be slid between them. Given that the dielectric constant of air is 1 and that of the dielectric material is 4, calculate the capacitance of the sensor when the input displacement x = 0.0 cm, 2.5 cm, 5.0 cm.	5	CO2	K1
	(OR)			

c.	Explain clearly about the measurement of self-inductance by Anderson bridge when the bridge is under balance condition.	5	CO1	K2
d.	A 3 phase, 440 V motor load has a power factor of 0.6. Two wattmeters connected to measure the power show the input to be 25 kW. Find the readings on each instrument.	5	CO3	K1
4.a.	Explain briefly the static characteristics of measuring instruments.	5	CO4	K3
b.	Explain single phase induction type energy meters with its source of errors.	5	CO1	K2
	(OR)			
c.	Explain the construction and connection diagram for a ratiometer type frequency meter.	5	CO2	K4
d.	Explain with a help of a connection diagram how the value of low resistance shunt could be determined by Kelvin Double arm bridge method.	5	CO3	K2
5.a.	Explain briefly the terms: (i) Static error (ii) Sensitivity (iii) Drift (iv) Accuracy (v) Repeatability.	5	CO1	K2
b.	Draw and explain a typical wiring of a PLC I/O module.	5	CO3	K5
	(OR)			
c.	Describe the typical operation of a Programmable Logic Controller (PLC).	5	CO4	K1
d.	Discuss the working principle of a simple D.C. potentiometer with a neat circuit diagram.	5	CO1	K4
6.a.	Explain the working of a frequency meter which depends on electrical resonance.	5	CO1	K1
b.	Prepare a ladder diagram to implement the control function in an elevator system.	5	CO4	K2
	(OR)			
c.	Explain how Weins Bridge can be used for determination of frequency. Derive the expressions for frequency in terms of bridge parameters.	5	CO2	K3
d.	Derive the relationship between resistance and strain for a strain gauge.	5	CO1	K2

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