Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem (Odd) Examination Dec-2022

EE3CO03 / EX3CO03

Electrical Measurement & Instrumentation

Programme: B.Tech. Branch/Specialisation: EE/EX

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

Q.1 i. Moving coil instruments are- **1**

(a) Permanent magnet type
(b) Dynamometer type
(c) Induction type
(d) Permanent magnet and dynamometer type

ii. The damping force in an instrument can be produced by air friction, eddy currents and fluid friction. Which among the three is most efficient? **1**

(a) Air friction (b) Eddy current
(c) Fluid friction (d) All are equal

iii. Most commonly used watt meter is- **1**

(a) Induction type (b) Electrostatic type
(c) Dynamometer type (d) Moving iron type

iv. The energy meter used for measuring energy of a dc circuit is- **1**

(a) Ampere hour meter (b) Induction type
(c) Electrostatic type (d) Dynamometer type

v. Current transformers and potential transformers are used to increase the ranges of- **1**

(a) AC ammeter and ac voltmeter respectively
(b) AC ammeter and dc voltmeter respectively
(c) DC ammeter and dc voltmeter respectively
(d) DC ammeter and ac voltmeter respectively

P.T.O.

vi. The accuracy in a bridge measurement depends on- **1**
(a) Sensitivity of detector
(b) Applied voltage
(c) Accuracy of indicator
(d) Both sensitivity of detector and applied voltage

vii. A null type of bridge with dc excitation is commonly known as- **1**
(a) Wien's bridge (b) Anderson bridge
(c) Wheatstone bridge (d) Schering bridge

viii. Maxwell's inductance capacitance bridge is used for coils of Q value- **1**
(a) Less than 1
(b) Less than 10
(c) Greater than 1 but less than 10
(d) More than 100

ix. LVDT is _____ type of transducer. **1**
(a) Resistive (b) Inductive (c) Capacitive (d) Optical

x. Phototransistor is a form of _____ transistor which is sensitive to light. **1**
(a) Unipolar (b) Bipolar (c) Tripolar (d) None of these

Q.2 i. Discuss the classification of errors that occurs in the measuring instruments. **3**

ii. Discuss working, construction, advantages & disadvantages of MI instrument. **7**

OR iii. Explain D' Arsonval galvanometer in detail. **7**

Q.3 i. Discuss the measurement of reactive power by single wattmeter. **3**

ii. Explain the measurement of total power in three phase circuit using two wattmeter method. **7**

OR iii. Explain the single-phase power factor meter in detail. Write its advantages & disadvantages also. **7**

Q.4 i. Compare potential and current transformers. **3**

ii. Explain loss of charge method for resistance measurement. How it is different from other methods? **7**

OR iii. Discuss following methods for measurement of earth resistance: **7**
(a) Fall of potential method (b) Earth tester

Q.5 i. What are different sources of errors in a Bridge circuit. **3**

ii. Discuss Anderson's bridge in detail. How this bridge is the advanced form of Maxwell's inductance capacitance bridge. **7**

OR iii. Discuss Schering bridge in detail. What are the advantages of this bridge? **7**

Q.6 Attempt any two:

i. Write short note on: **5**
(a) Piezo-electric transducer (b) Hall-effect transducer

ii. What is LVDT? Explain its working with necessary diagram and applications of LVDT. **5**

iii. Explain with neat diagram various parts and working of CRO. **5**

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Marking Scheme

EE-EX3CO03 Electrical Measurement & Instrumentation

Q.1	i)	d) permanent magnet and dynamometer type	**1**
	ii)	b) Eddy current	**1**
	iii)	c) dynamometer type	**1**
	iv)	a) ampere hour meter	**1**
	v)	a) ac ammeter and ac voltmeter respectively	**1**
	vi)	d) Both sensitivity of detector and applied voltage	**1**
	vii)	c) Wheatstone bridge	**1**
	viii)	c) greater than 1 but less than 10	**1**
	ix)	b) Inductive	**1**
	x)	b) Bipolar	**1**
Q.2	i.	Classification of errors that occurs in the measuring instruments.	**3**
	ii.	Working, construction, advantages & disadvantages of MI instrument.	**2,2, 1.5,1.5**
OR	iii.	Explanation of D' Arsonval galvanometer, Diagram	**5,2**
Q.3	i.	Measurement of reactive power by single wattmeter.	**3**
	ii.	Diagram, Derivation and method of calculation	**2,5**
OR	iii.	Explanation of single-phase power factor meter. Advantages & disadvantages.	**4, 1.5,1.5**
Q.4	i.	Compare potential and current transformers.	**3**
	ii.	Diagram	**2**
		Explain loss of charge methods for resistance measurement.	**3**
		How it is different from other methods?	**2**
OR	iii.	Discuss following methods for measurement of earth resistance: (a) Fall of potential method (b) Earth tester	**3.5*2=7**
Q.5	i.	What are different sources of errors in Bridge circuit.	**3**
	ii.	Discuss Andersons bridge in details.	**5**
		How this bridge is the advanced form of Maxwell's inductance capacitance bridge.	**2**
OR	iii.	Discuss Schering bridge in details.	**5**
		What are the advantages of this bridge?	**2**
Q.6		Attempt any two:	
	i.	Write short note on: (a) Piezo-electric transducer (b) Hall-effect transducer	**2.5*2=5**
	ii.	What is LVDT? Explain its working with necessary diagram and applications of LVDT.	**1,4**
	iii.	Explain with neat diagram various parts and working of CRO.	**2,3**

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