SREENIVASA INSTITUTE OF TECHNOLOGY AND MANAGEMENT STUDIES.
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

QUESTION BANK (DESCRIPTIVE)

Subject with Code : Measurements and Instrumentation (20EEE244)

Course & Branch: B.Tech – EEE **Year & Sem:** II-B.Tech & IV-Sem

UNIT – 1
INTRODUCTION

1	a	Define the terms "Indicating instruments", "Recording instruments" and integrating Instruments". Give examples of each.	[L1][CO1][8M]
	b	What are the different types of Ammeters and Voltmeters?	[L1][CO1][4M]
2		What are the different types of damping systems? Explain them with neatdiagram.	[L2][CO1][12M]
3	a	Illustrate the construction and working of permanent magnet moving coil instruments.	[L3][CO1][8M]
	b	List the advantages and disadvantages of PMMC type instruments.	[L1][CO1][4M]
4	a	Explain Dynamometer type instruments with neat sketch.	[L1][CO1][6M]
	b	Derive torque equations of Dynamometer type instruments	[L3][CO1][6M]
5	a	Describe the construction and working of attraction type MI instrument?	[L2[CO1]][6M]
	b	List the advantages & disadvantages of MI type instruments	[L1][CO1][6M]
6	a	Derive an expression for the Deflecting torque in MI type instruments	[L3][CO1][6M]
	b	Examine about errors and compensations of measuring instruments.	[L4][CO1][6M]
7	a	Justify, how do you extend the range of an Ammeter? Explain Aryton Shunt with diagram.	[L5][CO1][8M]
	b	A moving coil instrument gives a full -scale deflection of 10mA when the potential across its terminals is 100mV. Calculate shunt resistance for a full - scale deflection corresponding to 100 A	[L3][CO1][4M]
8	a	Choose a design for Aryton shunt to provide an ammeter with the current ranges 1 A, 5 A and 10 A. The basic meter resistance is 50 ohm and full scale deflection current is 1 mA.	[L5][CO1][6M]
	b	A moving coil instrument has a resistance of 10 ohm and gives a full scale deflection When carrying 50mA. Show how it can be adopted to measure voltage upto 750 V and current of 100 A.	[L3][CO1][6M]
9		Sketch Quadrant type Electrostatic voltmeter meter. Explain Heterostatic or Idiostatic Connections.	[L3][CO1][12M]
10		Explain the working of Kelvin Absolute Voltmeter. What are the advantagesand disadvantages of Electrostatic Instruments?	[L2][CO1][12M]

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UNIT – 2
MEASUREMENT OF POWER AND ENERGY

1	a	Explain the constructional details of electro dynamometer type wattmeterwith a neat sketch.	[L2][CO2][8M]
	b	Explain the advantages and disadvantages of single phase Induction typeEnergy meter.	[L2] [CO2][4M]
2	a	A 5 A, 110 V electrodynamic type wattmeter has a scale having 110 divisions. Its pressure coil is fed by a voltage of [110 √2 cos314) + √2sin(942t) V and its current coil carries a current of [5√ 2cos(314t + 60) +2√ 2sin (628t + 90) + √2cos(642t + 90)] A. Find the needle movement from zero position.	[L3] [CO2] [6M]
	b	Explain stray magnetic field errors in electro dynamometer type wattmeter.	[L2] [CO2] [6M]
3	a	Correlate how the measurements are made using LPF and UPF wattmeters.	[L5] [CO2] [6M]
	b	Explain errors caused by vibration of moving system electro dynamometertype wattmeter.	[L2] [CO2] [6M]
4	a	Explain how power can be measured in a 3 – phase circuit with help of twoelement method with neat sketch.	[L2] [CO2] [6M]
	b	Explain how power can be measured in a 3 – phase circuit with help of threeelement method with neat sketch.	[L2] [CO2] [6M]
5		Derive the torque equation for single phase electro dynamometer typewattmeter.	[L3][CO2][12M]
6		With a neat construction diagram, explain the operation of single phaseinduction type energy Meters	[L2][CO2][12M]
7	a	Derive the torque equation for single phase induction type energy meter.	[L3][CO2][6M]
	b	Explain driving system, moving system and braking system in a single phaseinduction	[L2][CO2][6M]
8	a	A single phase kilo watt hour meter makes 500 revolutions per kilo watt hour.It is found on testing as making 40 revolutions in 58.1 seconds at 5KW full load. Find the percentage error	[L3] [CO2] [4M]
	b	Explain creeping and justify how it can be compensated in 1-Ø induction type energy meter.	[L2] [CO2] [4M]

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	c	The reading of a dynamometer type wattmeter with pressure coil phase angle of 2° is 700 watts, when it is used to measure power of a single phase inductive load supplied by 240 V single phase ac. source. When the wattmeteris replaced by a second wattmeter with a phase angle of 1° for the pressure coil circuit, a reading of 620 watts is obtained. Assuming all errors of the wattmeter, except those due to pressure coil inductance are neglected. Calculate the actual power.	[L3][CO2][4M]
9	a	Discuss the errors of single phase energy meter.	[L2][CO2][6M]
	b	Explain the friction compensation in single phase induction type EnergyMeter.	[L2][CO2] [2M]
	c	Examine in a 50A , 230 V meter on full load test makes 61 revolutions in 37seconds . If the normal disc speed is 520 revolutions per Kwh , find the Percentage error	[L4][CO2][6M]
10	**a**	Explain with a neat sketch the construction and working of a Three phase energy meter.	[L2][CO2][6M]
	b	Explain the working of 2 element energy meter with a neat diagram.	[L2] [CO2] [6M]

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UNIT – 3
INSTRUMENT TRANSFORMERS AND PF METERS

1	a	Discuss C T and P T.	[L2] [CO3] [6M]
	b	Why secondary of C.T should not be open?	[L4] [CO3] [6M]
2		Explain the construction of (i) Current transformer (ii) Potential transformer.	[L2] [CO3] [12M]
3		Draw the phasor diagram of PT. Derive the expression for its transformationratio and phase angleerrors.	[L3] [CO3][12M]
4		Draw the equivalent circuit and phasor diagram of CT. Derive itstransformation ratio.	[L3] [CO3][12M]
5	a	Explain different types of PF meters	[L1] [CO3] [6M]
	b	Explain the advantages of PF meters	[L2] [CO3] [6M]
5	a	Explain in brief about MI instrument with neat sketch	[L1] [CO3] [6M]
	b	Discuss the errors occurring in MI instrument with advantages and disadvantages	[L2] [CO3] [6M]
6	a	Describe the principle and operation of Electro Dynamometer type instrument	[L2] [CO3] [4M]
	b	Discuss advantages and disadvantages in Electro Dynamometer type instrument	[L2] [CO5] [4M]
7	a	Describe the construction and working of Single phase meter	[L2] [CO5] [6M]
	b	Explain the principle of operation of Single phase meter	[L2] [CO5] [6M]
8	a	Describe the construction and working of three phase meter	[L2] [CO5] [6M]
	b	Explain the principle of operation of three phase meter	[L2] [CO5] [6M]
9		Describe the working principle of Frequency Meter	[L2][CO5][12M]
10	a	Explain in brief about the errors occurring in the instrument transformers	[L2] [CO5] [4M]
	b	Discuss the Compensation methods used in instrument transformer	[L2] [CO5] [4M]

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UNIT – 4
POTENTIOMETERS –DC AND AC BRIDGES

1	a	Explain classification of Potentiometer. What are the different types Potentiometers and Give brief Description about Potentiometers.	[L2] [CO4] [6M]
	b	Draw the circuit diagram of DC Potentiometer and Explain	[L3] [CO4] [6M]
2	a	What is AC Potentiometer? Explain Types of AC Potentiometer ?	[L1] [CO4] [4M]
	b	Explain the Principle and Operation of AC Potentiometer with Standardization.	[L3] [CO4] [8M]
3		Discuss about DC Crompton's Potentiometers with neat sketch and Explain the Applications.	[L4] [CO4] [12M]
4	a	Explain classification of resistances. What are the different types of methodsused for measurement of low, medium and high resistance?	[L2] [CO4] [6M]
	b	Draw the circuit diagram of a Wheatstone bridge and derive the condition forbalance.	[L3] [CO4] [6M]
5	a	What is the sensitivity of the Wheatstone bridge?	[L1] [CO4] [4M]
	b	The four arms of Wheatstone bridge as follows: AB = 5Kohm ; BC =? ; CD =10ohm ;DA = 2Kohm .What should be the resistance in the arm for no current through the Galvanometer?	[L3] [CO4] [8M]
6		Correlate substitution method and potentiometer method for measuringmedium resistances.	[L4] [CO4] [12M]
7	a	Justify how the inductance is measured in terms of known capacitance usingMaxwell"s bridge	[L5] [CO4] [8M]
	b	List the advantages and disadvantages of Maxwell"s Bridge.	[L1] [CO4] [4M]
8		An ac bridge circuit working at 1 KHz has its arms as follows: Arm AB: 0.2μf capacitance Arm BC: 500 ohm resistor Arm CD: unknown impedanceArm DA: 300 ohm resistor in parallel with 0.1μf capacitor Find R and L or C constants of the Arm CD considering it as a series circuit.	[L3] [CO4] [12M]
9		Explain the construction and working of Anderson Bridge with suitablediagrams.	[L2] [CO4] [12M]
10		Explain the features of De-Sauty"s Bridge with a neat sketch.	[L2] [CO4] [12M]
11		Explain Wien"s bridge can be used for experimental determination of frequency. Derive the expression to measure frequency in terms of bridge parameters.	[L5] [CO4] [12M]
12		Draw the circuit diagram of Schering Bridge. Derive the conditions forbalancing the bridge and draw the phasor diagram during balanced condition.	[L3] [CO4] [12M]

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UNIT – 5
CRO- DIGITAL METERS – TRANSDUCERS

1	a	Draw and Explain the Cathode Ray Oscilloscope showing Time base Generator	[L1] [CO5] [6M]
	b	Discuss Advantages and Disadvantages of CRO, Applications	[L2] [CO5] [6M]
2	a	Draw and Explain the Cathode Ray tube	[L1] [CO5] [6M]
	b	Discuss the uses of CRT in CRO with Neat sketch	[L2] [CO5] [6M]
3	a	What is Deflection System and Explain the types of Deflection System	[L2] [CO5] [4M]
	b	Explain about Horizontal Amplifier and its working	[L2] [CO5] [4M]
	c	Explain about Vertical Amplifier and its working	[L2] [CO5] [4M]
4	a	What is a transducer? Explain classification of transducers	[L1] [CO5] [6M]
	b	Explain the advantages of electrical transducer	[L2] [CO5] [6M]
5	a	What are the parameters to be considered in selecting a transducer for aparticular application?	[L1] [CO5] [6M]
	b	Illustrate the method for measurement of temperature with use of a) RTD b) IC Sensor	[L2] [CO5] [6M]
6	a	Describe the principle and operation of capacitive transducer	[L2] [CO5] [4M]
	b	Explain about inductive displacement transducers.	[L2] [CO5] [4M]
	c	Describe the principle and operation of capacitive transducer for angular displacement measurement	[L2] [CO5] [4M]
7	a	Describe the working principle of piezo electric transducers	[L2][CO5][12M]
8	a	Discuss in detail the Measurement of Torque using Transducer method	[L2] [CO5] [6M]
	b	Explain the Transducer Applications	[L2] [CO5] [4M]
9		Explain the Optical and Digital Transducers with working Principle	[L2][CO5][12M]