SIDDHARTH GROUP OF INSTITUTIONS:: PUTTUR
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QUESTION BANK (DESCRIPTIVE)

Subject with Code: Electronic Measurements &Instrumentatin (18EC0413)
Year & Sem: III-B.Tech & I Sem

Course & Branch: B.Tech - ECE

Regulation: R18

UNIT –I
PERFORMANCE CHARACTERISTICS OF INSTRUMENT

1	a	What is the difference between accuracy and precision of measurement?	[L2] [CO1]	[2M]
	b	Define speed of response and fidelity.	[L2] [CO1]	[2M]
	c	State the limitations of thermocouples.	[L1] [CO1]	[2M]
	d	Define sensitivity and resolution.	[L1] [CO1]	[2M]
	e	List the salient features of voltage ohm meter.	[L1] [CO1]	[2M]
2		a) Explain the construction of multi-range voltmeter & Range extension DC voltmeter.	[L2] [CO2]	[5M]
		b) A D'Arsonval movement with a full-scale deflection current of 50 µA and internal resistance of 500Ω is to be converted into a multirange voltmeter. Define the value of multiplier required for 0-20V, 0-50V, 0-100V.	[L6] [CO2]	[5M]
3		a) Explain different types of errors that occur in measurements.	[L2][CO1]	[5M]
		b) Explain about Differential type voltmeter.	[L2] [CO2]	[5M]
4		a) How do we determine the performance characteristics (static & dynamic) of an instrument?	[L2] [CO1]	[7M]
		b) Explain the process of calibration.	[L2] [CO1]	[3M]
5		a) Define sensitivity. Calculate the sensitivity of a 200 µA meter movement which is to be used as a dc voltmeter.	[L4] [CO1]	[4M]
		b) Draw and explain solid state DC Voltmeter.	[L2] [CO2]	[6M]
6		a) With neat sketch explain thermocouple type RF ammeter.	[L2] [CO2]	[5M]
		b) Explain the fundamental principle of AC voltmeter.	[L2] [CO2]	[5M]
7		a) Explain with the help of circuit diagram, the construction & working of a series type ohm meter.	[L2] [CO2]	[5M]
		b) Discuss about basic DC Ammeters.	[L2] [CO2]	[5M]
8		Explain how a multi-meter can be used as a) DC voltmeter & AC volt meter b) DC ammeter & ohmmeter.	[L2] [CO2]	[10M]
9		a) Explain with the help of circuit diagram the construction & working of a series type ohm meter.	[L2] [CO2]	[5M]
		b) A shunt type ohmmeter uses a5 mA basis D'Arsonval movement with an internal resistance of 50Ω. The battery voltage is 3V.It is desired to modify the circuits by adding appropriate shunt resistance across the movement.so that the instrument indicates 5Ω at the midpoint scale. Calculate: i) The value of shunt resistance. ii) Value of current limiting resistance R1.	[L6][CO2]	[5M]
10		a) Explain about static characteristics of measuring instrument.	[L2] [CO1]	[5M]
		b) Define the terms in dynamic characteristics i) Speed of Response ii) Fidelity iii) Lag.	[L2] [CO1]	[5M]

11	a) What are the different dynamic characteristics of an instrument.	[L2] [CO2]	[5M]
	b) Explain about multirange AC voltmeter.	[L2] [CO1]	[5M]

UNIT –II
OSCILLOSCOPES

1	a	Mention the standard specifications of a simple CRO.	[L1][CO2]	[2M]
	b	Mention various applications of CRO.	[L1][CO2]	[2M]
	c	What is the principle of CRO?	[L1][CO2]	[2M]
	d	Differentiate between dual beam and dual trace CRO.	[L1][CO2]	[2M]
	e	State the need of a time base generator.	[L1][CO2]	[2M]
2		a) Discuss about important CRT features.	[L2][CO3]	[4M]
		b) Draw the block diagram of a dual beam CRO, explain its operation.	[L4][CO3]	[6M]
3		a) State the various applications of an oscilloscope.	[L2][CO3]	[5M]
		b) Explain the function of trigger circuit.	[L2][CO3]	[5M]
4		a) Explain with the block diagram how the digital frequency and time period can be measured using counter/meter instrument.	[L2][CO3]	[5M]
		b) What are the different types of CRO probes?	[L1][CO3]	[5M]
5		Draw the block diagram of a general-purpose oscilloscope (CRO) and explain function of each block.	[L4][CO3]	[10M]
6		a) Explain the major parts of CRT with a block diagram.	[L2][CO3]	[5M]
		b) Explain Two electron beam (dual beam) CRO.	[L3][CO3]	[5M]
7		a) Draw the block diagram of Delay line circuit and explain its working.	[L2][CO3]	[5M]
		b) With neat sketch explain about vertical amplifier.	[L6][CO3]	[5M]
8		a) Discuss in detail, the construction and working of a Trigger sweep generator.	[L2][CO3]	[5M]
		b) Explain with a diagram how phase can be measured using a Lissajous method	[L3][CO2]	[5M]
9		a) Explain with a diagram how frequency can be measured using a Lissajous method.	[L2][CO2]	[5M]
		b) Briefly discuss about dual trace CRO.	[L2][CO3]	[5M]
10		a) Draw the neat diagrams of horizontal deflection systems and explain briefly about their working.	[L2][CO2]	[6M]
		b) State the standard specifications of a sample CRO.	[L2][CO3]	[4M]
11		a) Describe in details the construction and working of a digital storage oscilloscope.	[L2][CO3]	[5M]
		b) Construct delayed line sweep circuit and explain its operation.	[L6][CO3]	[5M]

UNIT –III
SIGNAL GENERATORS

1	a	Define the basic operating principle of signal generator.	[L1][CO3]	[2M]
	b	Mention the applications of function generator.	[L1][CO3]	[2M]
	c	State the principle of heterodyne wave analyser.	[L1][CO3]	[2M]
	d	Mention the applications of wave analyser.	[L1][CO3]	[2M]
	e	State the principle of basic sine wave generator.	[L1][CO3]	[2M]
2	a) With the help of block diagram explain the functioning of a conventional standard signal generator.		[L2][CO3]	[5M]
	b) Write about fixed AF oscillator and variable AF oscillator.		[L2][CO3]	[5M]
3	a) Draw the block diagram of a function generator and explain its operation.		[L4][CO3]	[5M]
	b) List the applications of random noise generator.		[L1][CO4]	[5M]
4	With a neat diagram discuss the operation of a pulse generator.		[L4][CO4]	[10M]
5	a) Discuss in detail about pulse generator .		[L2][CO4]	[5M]
	b) Explain the method of generating Random noise.		[L2][CO4]	[5M]
6	a) Explain the working of a standard sweep generator with diagram.		[L2][CO4]	[5M]
	b) What is sweep generator? Explain in detail.		[L2][CO4]	[5M]
7	a) With help of a neat sketch, explain the working of any one of wave analyzer.		[L2][CO4]	[5M]
	b) What is the function of wave analyzer?		[L2][CO4]	[5M]
8	a) Describe with diagram the operation of a Logic analyzer.		[L2][CO4]	[5M]
	b) List the application of wave analyzers.		[L1][CO4]	[5M]
9	a) Draw the circuit diagram and explain the working of a spectrum analyzer.		[L2][CO4]	[5M]
	b) What is distortion? What does a distortion analyzer measure?		[L2][CO4]	[5M]
10	a) What is the function of harmonic distortion analyzer?		[L2][CO4]	[5M]
	b) Describe the diagram with operation of a harmonic distortion analyzer using Wein bridge and frequency selective type.		[L2][CO4]	[5M]
11	a) With a neat sketch explain the operation of arbitrary waveform generator.		[L2][CO4]	[5M]
	b) What are the different specifications of arbitrary waveform generator?		[L2][CO4]	[5M]

UNIT –IV
REVIEW OF DC & AC BRIDGES

1	a	What is a bridge? What is the importance of a bridge?	[L1][CO4]	[2M]
	b	What is the balance condition for a basic kelvin bridge?	[L1][CO4]	[2M]
	c	What is meant by q-meter?	[L1][CO4]	[2M]
	d	Draw the circuit of Kelvin's Double Bridge.	[L1][CO4]	[2M]
	e	What are the different errors occurred in bridges?	[L1][CO4]	[2M]
2		a) Discuss the working principle of Q-meter &its applications.	[L2][CO3]	[5M]
		b) Write short note on interference &explain noise reduction techniques.	[L2][CO6]	[5M]
3		Explain any Two ac bridges to measure unknown Inductance.	[L2][CO5]	[10M]
4		Explain the operation of Kelvin Bridge and derive necessary equation.	[L2][CO5]	[10M]
5		What is the function of bridge? Draw the Anderson's bridge circuit and derive necessary equations& explain it.	[L2][CO5]	[10M]
6		a) Explain the Schering bridge circuit &its applications.	[L2][CO5]	[5M]
		b) An A.C bridge as the following constants Arm AB-capacitor of 0.1µF in parallel with 2KΩ resistor, Arm AD-resistance of 5KΩ, Arm BC capacitor of 0.25 µF, Arm CD-unknown capacitor CX and RX in series f-2KHz.Determine the unknown capacitance and dissipation factor.	[L6][CO5]	[5M]
7		a) Explain how a Maxwell bridge can be used for measuring an unknown inductance.	[L2][CO5]	[5M]
		b) What is interference &explain noise reduction techniques.	[L2][CO6]	[5M]
8		Describe the operation of the Wheatstone bridge & derive the expression for current when the bridge is unbalanced.	[L2][CO5]	[10M]
9		a) Explain how a Maxwell bridge can be used for measuring an unknown inductance.	[L2][CO5]	[5M]
		b) A Maxwell bridge is used to measure an inductive impedance the bridge constants at balance are C1=0.01 µF, R1=470KΩ, R2=5.1 KΩ and R3=100 KΩ. Find the series equivalent of the unknown impedance.	[L6][CO5]	[5M]
10		a) What are the applications of Wheatstone bridge? And list out its limitations.	[L4][CO6]	[5M]
		b) Describe the operation of the Wheatstone bridge and derive the expression for DC resistance.	[L2][CO5]	[5M]
11		a) Describe in detail about EMI &EMC with suitable examples.	[L2][CO3]	[5M]
		b) Explain the working principle & operation of Capacitance & Inductance bridge circuit.	[L2][CO5]	[5M]

UNIT –V
SENSORS AND TRANSDUCERS

1	a	Define sensor and transducers.	[L1][CO5]	[2M]
	b	Mention the disadvantages of LVDT.	[L1][CO5]	[2M]
	c	What is the basic principle involved in piezoelectric transducers?	[L1][CO5]	[2M]
	d	Name one passive and active sensors.	[L1][CO5]	[2M]
	e	What are the merits & demerits of Thermocouple?	[L1][CO5]	[2M]
2		With a neat sketch explain the operation of LVDT. What are the advantages & disadvantages?	[L1][CO5]	[10M]
3		Explain strain gauge for resistance measurement & its applications.	[L2][CO5]	[10M]
4		a) What are the differences between the active & passive transducers?	[L2][CO5]	[5M]
		b) Explain the operation of potentiometric transducer.	[L2][CO5]	[5M]
5		a) Define a transducer.	[L1][CO5]	[3M]
		b) Explain about any one of transducer to measure displacement.	[L2][CO5]	[7M]
6		a) Draw the diagram of Resistance Thermometer & explain briefly.	[L2][CO5]	[5M]
		b) Explain the operation of Thermistor.	[L2][CO5]	[5M]
7		a) With a neat sketch, explain the operation of piezo-electric transducers in detail.	[L2][CO5]	[5M]
		b) Briefly discuss about Velocity transducers.	[L2][CO5]	[5M]
8		a) Discuss about Accelerometer.	[L2][CO5]	[5M]
		b) Explain about vibration.	[L2][CO5]	[5M]
9		a) Discuss about Sensors and Transducers.	[L1][CO5]	[5M]
		b) How to convert linear variable displacement into electrical voltage using transducer.	[L2][CO5]	[5M]
10		Describe the operation of i) resistive transducers ii) capacitive transducers iii) Inductive transducers.	[L2][CO5]	[10M]
11		Explain the operation of Thermocouple.	[L2][CO5]	[10M]

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