



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

Subject with Code : EMI(18EC0413)

Course & Branch: B.Tech – ECE

Year & Sem: III B.Tech & I Sem

Regulation: R18

UNIT –I

1. 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]
2. a) Explain the construction of multi-range voltmeter & Range extension DC voltmeter. [L2][CO1][5M]
b) A D'Arsonval movement with a full-scale deflection current of $50 \mu\text{A}$ 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][CO1][5M]
3. a) Explain different types of errors that occur in measurements. [L2][CO1][5M]
b) Explain about Differential type voltmeter. [L2][CO1][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 $200 \mu\text{A}$ meter movement which is to be used As a dc voltmeter. [L4][CO1][4M]
b) Draw and explain solid state DC Voltmeter. [L2][CO1][6M]
6. a) Explain the dynamic response of an instrument. [L2][CO1][5M]
b) Explain about multirange AC voltmeter. [L2][CO1][5M]
7. a) With neat sketch explain thermocouple type RF ammeter. [L2][CO1][5M]
b) Explain the fundamental principle of AC voltmeter. [L2][CO1][5M]
8. a) Describe with the help of circuit diagram the construction and working of a Multi meter. [L2][CO1][6M]
b) Discuss about basic DC Ammeters. [L2][CO1][4M]
9. Explain how a multi-meter can be used as
i) DC voltmeter & AC volt meter. [L2][CO1][5M]
ii) DC ammeter & ohmmeter. [L2][CO1][5M]
10. a) Explain with the help of circuit diagram the construction & working of a series type ohm meter. [L2][CO1][5M]
b) A shunt type ohmmeter uses a 5 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 R_1 . [L6][CO1][5M]

UNIT –I**PERFORMANCE CHARACTERISTICS OF INSTRUMENTS:**

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| 1. What is meant by measurement? | [L1][CO1][2M] |
| 2. Define Instrument. | [L1][CO1][2M] |
| 3. What is Resolution? | [L1][CO1][2M] |
| 4. Define – Repeatability | [L1][CO1][2M] |
| 5. What is Relative error? | [L1][CO1][2M] |
| 6. Define threshold | [L1][CO1][2M] |
| 7. Define linearity | [L1][CO1][2M] |
| 8. List the Performance Characteristics of an Instrument | [L1][CO1][2M] |
| 9. Define Accuracy | [L1][CO1][2M] |
| 10. Define Sensitivity | [L1][CO1][2M] |
| 11. Compare accuracy and precision of an instrument | [L1][CO1][2M] |
| 12. What are types of ohm meters and what are they | [L1][CO1][2M] |
| 13. What are the Statistical Analysis of an Instrument? | [L1][CO1][2M] |
| 14. Define Variance | [L1][CO1][2M] |
| 15. Define Standard Deviation | [L1][CO1][2M] |
| 16. What is meant by Arithmetic Mean | [L1][CO1][2M] |
| 17. Define Calibration | [L1][CO1][2M] |
| 18. Define Fidelity of an Instrument | [L1][CO1][2M] |
| 19. Define Error. | [L1][CO1][2M] |
| 20. Explain various errors in instrumentation system | [L1][CO1][2M] |

UNIT –II

1. 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][CO2][4M]
2. a) Discuss about important CRT features. [L2][CO2][4M]
 b) Draw the block diagram of a dual beam oscilloscope & explain its working. [L4][CO2][6M]
3. Draw the block diagram of a general-purpose oscilloscope (CRO) and explain function of each block. [L4][CO2][10M]
4. a) Explain the major parts of CRT with a block diagram. [L2][CO2][5M]
 b) Explain Two electron beam(dual beam) CRO. [L3][CO2][5M]
5. a) Draw the block diagram of Delay line circuit and explain its working. [L2][CO2][5M]
 b) With neat sketch explain about vertical amplifier. [L6][CO2][5M]
6. a) Discuss in detail, the construction and working of a Trigger sweep generator. [L2][CO2][5M]
 b) Explain with a diagram how phase can be measured using a Lissajous method. [L2][CO2][5M]
7. a) Describe in details the construction and working of an digital storage oscilloscope. [L2][CO2][5M]
 b) Construct delayed line sweep circuit, explain the operation. [L6][CO2][5M]
8. a) State the various applications of an oscilloscope. [L2][CO2][5M]
 b) Explain the function of trigger circuit. [L2][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][CO2][5M]
10. a) Explain with the block diagram how the digital frequency and time period can be measured using counter/meter instrument. [L2][CO2][5M]
 b) What are the different types of CRO probes? [L1][CO2][5M]

UNIT –II
OSCILLOSCOPES:

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|---------------------------------------------------------------------|---------------|
| 1. What is CRO? | [L1][CO2][2M] |
| 2. What are the main parts of CRO? | [L1][CO2][2M] |
| 3. What are the various probes of CRO? | [L1][CO2][2M] |
| 4. List out the main parts of Cathode ray tube. | [L1][CO2][2M] |
| 5. What is function of electron gun? | [L1][CO2][2M] |
| 6. List the types of deflection plate. | [L1][CO2][2M] |
| 7. Define Deflection Sensitivity? | [L1][CO2][2M] |
| 8. What is the use of phosphor in a CRT? | [L1][CO2][2M] |
| 9. What is a digital storage oscilloscope? | [L1][CO2][2M] |
| 10. What is a digital storage oscilloscope? | [L1][CO2][2M] |
| 11. What is the purpose of trigger circuit in CRO? | [L1][CO2][2M] |
| 12. List the standard specifications of CRO. | [L1][CO2][2M] |
| 13. What are the active probes? | [L1][CO2][2M] |
| 14. Why delay line is used in CRO. | [L1][CO2][2M] |
| 15. What is the difference between digital and analog Oscilloscope. | [L1][CO2][2M] |
| 16. Mention the applications of oscilloscopes? | [L1][CO2][2M] |
| 17. Mention the advantages of digital storage oscilloscope? | [L1][CO2][2M] |
| 18. Define Lissajous Method? | [L1][CO2][2M] |
| 19. What are the features of CRT? | [L1][CO2][2M] |
| 20. What is aluminizing? | [L1][CO2][2M] |

UNIT –III

1. 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]
2. 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][CO3][5M]
3. With a neat diagram discuss the operation of a pulse generator. [L2][CO3][10M]
4. a) Discuss in detail about pulse generator . [L2][CO3][5M]
 b) Explain the method of generate random noise. [L2][CO3][5M]
5. a) Explain the working of a standard sweep generator with diagram. [L2][CO3][5M]
 b) What is sweep generator? Explain in detail. [L2][CO3][5M]
6. a) With help of a neat sketch, explain the working of any one of wave analyzer. [L2][CO3][5M]
 b) What is the function of wave analyzer? [L2][CO3][5M]
7. a) Describe with diagram the operation of a Logic analyzer. [L2][CO3][5M]
 b) List the application of wave analyzers. [L1][CO3][5M]
8. a) Draw the circuit diagram and explain the working of a spectrum analyzer. [L2][CO3][5M]
 b) What is distortion? What does a distortion analyzer measure? [L2][CO3][5M]
9. a) What is the function of harmonic distortion analyzer. [L2][CO3][5M]
 b) Describe the diagram with operation of a harmonic distortion analyzer using Wein Bridge
 And frequency selective type. [L2][CO3][5M]
- 10.a) With a neat sketch explain the operation of arbitrary waveform generator. [L2][CO3][5M]
 b) What are the different specifications of arbitrary waveform generator? [L2][CO3][5M]

UNIT –III**SIGNAL GENERATORS & ANALYZERS:**

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| 1. What is a wave analyzer? | [L1][CO3][2M] |
| 2. What is Harmonic distortion? | [L1][CO3][2M] |
| 3. What do you mean by heterodyne principle? | [L1][CO3][2M] |
| 4. What is the use of wave analyzer? | [L1][CO3][2M] |
| 5. What are the two basic configurations of wave analyzer? | [L1][CO3][2M] |
| 6. What is harmonic distortion? | [L1][CO3][2M] |
| 7. Define Oscillator? | [L1][CO3][2M] |
| 8. List the types of AF Oscillators? | [L1][CO3][2M] |
| 9. What are the variable AF Oscillators? | [L1][CO3][2M] |
| 10. What is Marker generator? | [L1][CO3][2M] |
| 11. What are the features of function generator? | [L1][CO3][2M] |
| 12. What are the advantages of sweep generator? | [L2][CO3][2M] |
| 13. What is distortion? | [L2][CO3][2M] |
| 14. Write the formula for total harmonic distortion? | [L2][CO3][2M] |
| 15. List the types of frequency synthesizers? | [L2][CO3][2M] |
| 16. What is the need of a time base generator? | [L1][CO3][2M] |
| 17. What are the types of logic analyzers? | [L1][CO3][2M] |
| 18. Define Amplitude distortion? | [L1][CO3][2M] |
| 19. Define Cross over distortion? | [L1][CO3][2M] |
| 20. Define Frequency distortion? | [L1][CO3][2M] |

UNIT –IV

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

UNIT –IV
BRIDGES:

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|--------------------------------------------------------|---------------|
| 1. List the applications of Q meter? | [L1][CO4][2M] |
| 2. What are the different connections used in Q meter? | [L1][CO4][2M] |
| 3. What is Schering's bridge? | [L1][CO4][2M] |
| 4. What is a bridge circuit? | [L1][CO4][2M] |
| 5. What is Anderson's bridge? | [L1][CO4][2M] |
| 6. List out the advantages of bridge circuits? | [L1][CO4][2M] |
| 7. What is Q meter? | [L1][CO4][2M] |
| 8. What is Maxwell's Inductance – Capacitance Bridge? | [L1][CO4][2M] |
| 9. What are the various methods to eliminate EMI? | [L1][CO4][2M] |
| 10. What are the different EMI Sources in Circuits? | [L1][CO4][2M] |
| 11. What is meant by Q-factor? | [L1][CO4][2M] |
| 12. What are types of DC Bridge? | [L1][CO4][2M] |
| 13. List the types of AC bridges? | [L1][CO4][2M] |
| 14. Define distributed capacitance in Q-meter? | [L1][CO4][2M] |
| 15. Define Dissipation factor? | [L1][CO4][2M] |
| 16. Define Power Factor? | [L1][CO4][2M] |
| 17. Write the Effects of EMI? | [L1][CO4][2M] |
| 18. What is a Bridge? | [L1][CO4][2M] |
| 19. What is Wheatstone balanced bridge? | [L1][CO4][2M] |
| 20. What is Wheatstone unbalanced balanced bridge? | [L1][CO4][2M] |

UNIT –V

1. With a neat sketch explain the operation of LVDT. What are the advantages & disadvantages?
[L1][CO5][10M]
2. Explain strain gauge for resistance measurement & its applications. [L2][CO5][10M]
3. Describe the operation of
 - i) resistive transducers
 - ii) Capacitive transducers
 - iii) Inductive transducers. [L2][CO5][5M]
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 thermocouples and thermistors? [L2][CO5][5M]
7. Write short notes on thermometer. [L2][CO5][10M]
 8. 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]
9. a) Discuss about Accelerometer. [L2][CO5][5M]
b) Explain about vibration. [L2][CO5][5M]
10. a) Discuss about Sensors and Transducers. [L1][CO5][5M]
b) How to convert linear variable displacement into electrical voltage using transducer. [L2][CO5][5M]

UNIT –V
TRANSDUCERS:

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| 1. Define transducer? | [L1][CO5 [2M] |
| 2. What are the passive transducers? | [L1][CO5 [2M] |
| 3. List the Active transducers? | [L1][CO5 [2M] |
| 4. What is primary transducer? | [L1][CO5 [2M] |
| 5. What is secondary transducer? | [L1][CO5 [2M] |
| 6. What is analog transducer? | [L1][CO5 [2M] |
| 7. What is piezo-resistive effect? | [L1][CO5 [2M] |
| 8. What is piezoelectric effect? | [L1][CO5 [2M] |
| 9. What are the different types of strain gauge? | [L1][CO5 [2M] |
| 10. List the applications of strain gauge? | [L1][CO5 [2M] |
| 11. What is LVDT? | [L1][CO5 [2M] |
| 12. List the applications of LVDT? | [L1][CO5 [2M] |
| 13. Define Active Transducer? | [L1][CO5 [2M] |
| 14. Define Passive Transducer? | [L1][CO5 [2M] |
| 15. What is the difference between Active and passive transducers? | [L1][CO5 [2M] |
| 16. What are the advantages of thermocouple? | [L1][CO5 [2M] |
| 17. Define sensor? | [L1][CO5 [2M] |
| 18. Define Thermistor? | [L1][CO5 [2M] |
| 19. Define Thermocouple? | [L1][CO5 [2M] |
| 20. List the applications of Capacitive Transducer? | [L1][CO5 [2M] |

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