

B.Tech III Year II Semester (R20) Regular Examinations August 2023
ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
 (Electronics & Communication Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
 (Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- | | | |
|-----|--|----|
| (a) | Define the following terms: Accuracy, precision, Repeatability and Reproducibility. | 2M |
| (b) | Why ohmmeter is used? And write its classification. | 2M |
| (c) | Write the roles of horizontal and vertical amplifiers in CRO. | 2M |
| (d) | List the Applications of CRO. | 2M |
| (e) | List the requirements of a pulse. | 2M |
| (f) | Differentiate Function generators from Signal generators. | 2M |
| (g) | State the two conditions that must be satisfied to obtain bridge balance. | 2M |
| (h) | Discuss the noise reduction techniques. | 2M |
| (i) | What are capacitive transducers? Give the expression for a capacitance of a capacity transducer. | 2M |
| (j) | What are the factors to be considered for the selection of better transducer? | 2M |

PART – B
 (Answer all the questions: 05 X 10 = 50 Marks)

- 2 (a) Compare AC and DC Voltmeters and ammeters. 5M
 (b) A voltmeter having a sensitivity of $1 K\Omega/V$ is connected across an unknown resistance in series with a milli ammeter reading 80 V on 150 V scale. When the milli ammeter reads 10 mA, Calculate the 5M
 (i) apparent resistance of the unknown resistor;
 (ii) Actual resistance of the unknown resistor;
 (iii) Error due to the loading effect of the voltmeter.
- OR**
- 3 (a) Explain how a multi-meter can be used as (i) DC voltmeter (ii) AC volt meter and (iii) ohmmeter. 6M
 (b) The following values are obtained from the measurements of the value of a resistor: 4M
 147.2, 147.4, 147.9, 147.1, 147.5, 147.6, 147.4, 147.6, 147.5.
 Calculate, (i) Arithmetic mean (ii) Average deviation (iii) Standard Deviation.
- 4 (a) Explain about storage oscilloscope with block diagram. 5M
 (b) Explain the working of Dual Beam CRO with neat block diagram. 5M
- OR**
- 5 (a) List out the different types of probes used for CROs. Explain about each of them. 5M
 (b) Draw the block diagram of Delay line circuit and explain its working. 5M
- 6 (a) Explain the method of generating of random noise with neat sketch. 5M
 (b) With a neat sketch explain the operation of Spectrum analyser. 5M
- OR**
- 7 (a) Draw the circuit diagram and explain the working of a heterodyne type wave analyser. 5M
 (b) Explain the working of a standard sweep generator with diagram. 5M

- 8 Draw the Anderson's bridge circuit and derive necessary equations & explain it. Also Draw the phasor diagram for conditions under balance. 10M

OR

- 9 (a) In a certain Wheatstone bridge $R_b = 400\text{ k}\Omega$, $R_b = 100\text{ k}\Omega$, $R_d = 300\text{ k}\Omega$ usual notation. Determine the current through the detector galvanometer. 5M
- (b) A Maxwell bridge is used to measure inductive impedance. The bridge constants at balance are $C_1 = 0.01\text{ }\mu\text{F}$, $R_1 = 470\text{ k}\Omega$, $R_2 = 5.1\text{ k}\Omega$ and $R_3 = 100\text{ k}\Omega$. Find the series equivalent of the unknown impedance. 5M
- 10 (a) Describe the operations of resistance thermometer and state the advantages and limitations. 5M
- (b) Explain any one method for the measurement of acceleration. 5M

OR

- 11 Explain the principle, working, construction, Characteristics and applications of LVDTs. Also. State advantages and disadvantages of LVDT. 10M

B.Tech III Year II Semester (R20) Supplementary Examinations January 2024

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(Electronics & Communication Engineering)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)

1 Answer the following: (10 X 02 = 20 Marks)

- | | |
|---|----|
| (a) What are the different types of errors possible in an instrument? | 2M |
| (b) Write about DC Ammeters. | 2M |
| (c) Discuss about important CRT features. | 2M |
| (d) What are the different types of probes in CRO? | 2M |
| (e) Distinguish between square and pulse wave generators. | 2M |
| (f) State the different types of wave analyzers. | 2M |
| (g) List out the different precautions to be taken when using a Bridge with an example. | 2M |
| (h) Write the principle of Q meter. | 2M |
| (i) List the classification of Transducers. | 2M |
| (j) Differentiate between Thermistors and Thermocouple. | 2M |

PART – B

(Answer all the questions: 05 X 10 = 50 Marks)

- | | |
|---|----|
| 2 (a) With neat sketch explain about thermocouple type RF Ammeter. | 5M |
| (b) Explain about the construction & working of a Series Type Ohm Meter with neat sketch. | 5M |

OR

- | | |
|---|----|
| 3 (a) Explain about static characteristics of measuring instrument. | 5M |
| (b) A D'Arsonval movement with a full scale deflection current of 50 μ A and internal resistance of 500 Ω is to be converted into a multirange voltmeter. Define the value of multiplier required for 0-20 v, 0-50 v, 0-100 v. | 5M |

- | | |
|---|----|
| 4 (a) Discuss in detail, the construction and working of a digital sampling oscilloscope. | 5M |
| (b) Compare dual trace oscilloscopes and dual beam CRO. | 5M |

OR

- | | |
|--|----|
| 5 (a) Explain with a diagram how frequency & phase can be measured using a Lissajous method. | 5M |
| (b) Explain in details the construction and working principle of Time base generator. | 5M |

- | | |
|---|----|
| 6 (a) Explain the working of Arbitrary Waveform Generator. | 5M |
| (b) Describe about the operation of a Logic analyser with neat diagram. | 5M |

OR

- | | |
|---|----|
| 7 (a) Describe the diagram with operation of a harmonic distortion analyser using Wein bridge and frequency selective type. | 5M |
| (b) Write about fixed AF oscillator and variable AF oscillator. | 5M |

- | | |
|---|----|
| 8 (a) Describe in detail about EMI & EMC with suitable examples. | 5M |
| (b) Explain how a Maxwell bridge can be used for measuring an unknown inductance. | 5M |

OR**Contd. in Page 2**

- 9 (a) In the case of a Schering Bridge, arm AC has $R = 4.7 \text{ k}\Omega$. Arm CD has unknown elements. 5M
Arm BD has $C = 0.1 \text{ }\mu\text{F}$ Arm AB = $4.7 \text{ K}\Omega$ is shunt with 1MF . Determine Values of components
is the arm CD.
- (b) A Kelvin's Bridge consist of $R_a = 1600 R_b$, $R_1 = 800 R_b$ and $R_2 = 1.25 R_2$. Calculate the value of 5M
 R_x , if applied DC voltage is 1.5 V .
- 10 (a) Define Piezo-electric effect? Describe with the diagram the operations of a piezo electric 5M
transducer.
- (b) What are Strain gauges? Explain the Principle and working of Strain gauges. 5M
- OR**
- 11 (a) Describe any one method for the measurement of the velocity. 5M
- (b) Explain about pH measurement. 5M
