



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal-500043, Hyderabad

B.Tech V SEMESTER END EXAMINATIONS (REGULAR/ SUPPLEMENTARY) - FEBRUARY 2024

Regulation: UG20

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(ELECTRONICS AND COMMUNICATION ENGINEERING)

Time: 3 Hours

Max Marks: 70

Answer ALL questions in Module I and II

Answer ONE out of two questions in Modules III, IV and V

All Questions Carry Equal Marks

All parts of the question must be answered in one place only

MODULE – I

1. (a) Discuss the dynamic characteristics of measuring system and infer the importance in instrumentation. [BL: Understand| CO: 1|Marks: 7]
- (b) The expected value of the voltage to be measured is 150V. However, the measurement gives a value of 149V. Calculate
 - i) Absolute error
 - ii) Percentage error
 - iii) Relative accuracy
 - iv) Percentage accuracy [BL: Apply| CO: 1|Marks: 7]

MODULE – II

2. (a) Draw the block diagram of a general purpose oscilloscope(CRO) and explain function of each block in detail. [BL: Understand| CO: 2|Marks: 7]
- (b) In an experiment, the voltage across a $10\text{ k}\Omega$ resistor is applied to CRO. The screen shows a sinusoidal signal of total vertical occupancy 3cm and total horizontal occupancy of 2 cm. The front-panel controls of V/div and time/div are on 2 V/div and 2 ms/div respectively. Calculate the RMS value of the voltage across the resistor and its frequency [BL: Apply| CO: 2|Marks: 7]

MODULE – III

3. (a) List the requirements of a pulse. Draw the block diagram of a function generator and explain its operation. [BL: Understand| CO: 3|Marks: 7]
- (b) Differentiate between function generators from signal generators. Describe the working of a standard sweep generator with suitable diagram. [BL: Understand| CO: 3|Marks: 7]
4. (a) Explain the working of a heterodyne type wave analyzer with a circuit diagram. [BL: Understand| CO: 4|Marks: 7]
- (b) Describe the operation of a harmonic distortion analyzer by using Wein bridge and frequency selective type with suitable diagram. [BL: Understand| CO: 4|Marks: 7]

MODULE – IV

5. (a) Outline the working principle of wheatstone's bridge and derive the bridge sensitivity with fundamentals [BL: Understand| CO: 5|Marks: 7]
- (b) In the wheatstone bridge, the value of $R_1 = 200\Omega$, $R_2 = 800\Omega$ and $R_3 = 300\Omega$. The bridge is excited by a 200 V DC source. Determine the value of resistor R_4 , power dissipated by the resistor R_4 when the bridge is balanced and assume galvanometer current is zero. [BL: Apply| CO: 5|Marks: 7].
6. (a) Determine the expression for finding unknown resistance of Kelvin's double bridge. [BL: Understand| CO: 5|Marks: 7]
- (b) A Maxwell bridge is used to measure an inductive impedance the bridge constants at balance are $C_1=0.01\mu\text{F}$, $R_1=470\text{K}\Omega$, $R_2=5.1\text{K}\Omega$ and $R_3=100\text{K}\Omega$. Find the series equivalent of the unknown impedance. [BL: Apply| CO: 5|Marks: 7]

MODULE – V

7. (a) Identify the applications of Hall effect transducer can be used as displacement transducer where it act as proximity detector. [BL: Understand| CO: 6|Marks: 7]
- (b) Illustrate the operation of video signal generator which is suitable for real time implementation in medical electronics. [BL: Understand| CO: 6|Marks: 7]
8. (a) Summarize the working of spectrum analyzer and analyze the relative amplitude of the signal. [BL: Understand| CO: 6|Marks: 7]
- (b) Outline the construction and working principle of LVDT. List the advantages and disadvantages of LVDT. [BL: Understand| CO: 6|Marks: 7]

