

CBCS SCHEME

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18EI/BM32

Third Semester B.E. Degree Examination, July/August 2022 Electronic Instrumentation and Measurements

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Explain the different methods of measurement and functions of Measurement Systems. (10 Marks)
- b. Build and explain the elements of generalized measurement system. (10 Marks)

OR

- 2 a. Define : i) Accuracy ii) Precision iii) Resolution in error. (04 Marks)
- b. The value of the voltage across the resistor is 5V. the voltmeter reads 4.95V. Calculate absolute error, % error, relative accuracy and % of accuracy. (06 Marks)
- c. With relevant circuit diagrams of derivations, show that :
i) for $X = A \pm B$, error in $X = [(\text{errorin } A) + (\text{errorin } B)]$.
ii) for $X = AB$, error in $X = [(\% \text{ errorin } A) + (\% \text{ errorin } B)]$. (10 Marks)

Module-2

- 3 a. Convert a basic D'Arsonval movement into a dc ammeter and derive the equation for shunt resistance. (06 Marks)
- b. A basic D'Arsonval movement with a full scale deflection of 2mA and internal resistance of 50Ω is used as a multi range voltmeter. Determine the value of the multiplier resistance needed to measure the range 0 - 10V, 0 - 50V and 0 - 100V and 0 - 250V. (06 Marks)
- c. Explain the working of true RMS voltmeter with the help of a neat diagram. (08 Marks)

OR

- 4 a. List the advantages of digital instruments over analog instruments. (04 Marks)
- b. Draw the basic block diagram of ramp type DVM and explain its operation with wave forms. (08 Marks)
- c. Explain with a neat block diagram, the operation of dual slope integrating type DVM. (08 Marks)

Module-3

- 5 a. Draw the basic block diagram of oscilloscope. Explain the functions of each block. (08 Marks)
- b. With a neat block diagram, explain various components of CRT. (08 Marks)
- c. Explain the CRT features briefly. (04 Marks)

OR

- 6 a. Write an explanatory note on dual beam CRO, with a neat block diagram. (10 Marks)
- b. Explain the basic operation of Bistable analog storage oscilloscope, with a neat block diagram. (10 Marks)

Module-4

- 7 a. With a neat block diagram, explain the operation of conventional standard signal generator. Mention its limitations. (10 Marks)
- b. With a neat block diagram, explain the operation of AF sine and square wave generator. (10 Marks)

OR

- 8 a. State the limitations and applications of wheat stone bridge. (06 Marks)
b. Draw the circuit diagram and derive the balance equation of Schering bridge. (08 Marks)
c. A capacitance comparison bridge is used to measure a capacitive impedance at a frequency of 2kHz. The bridge constant at balance are $C_3 = 100\mu\text{F}$, $R_1 = 10\text{k}\Omega$ and $R_2 = 50\text{k}\Omega$, $R_3 = 100\text{k}\Omega$. Find the equivalent circuit of the unknown impedance. (06 Marks)

Module-5

- 9 a. Explain the theory behind the working of an LED. (08 Marks)
b. List the advantages and disadvantages of LEDs. (04 Marks)
c. Explain seven segment display, with a neat diagram. (08 Marks)

OR

- 10 a. List the important features of LCD. (04 Marks)
b. With a neat diagram, describe the basic construction of strip chart recorder. Discuss different types of marking mechanisms used. (10 Marks)
c. Describe the basic components of a magnetic tape recorder used for instrumentation applications. Also mention the methods of magnetic tape recording. (06 Marks)

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