

**CMR ENGINEERING COLLEGE: : HYDERABAD**  
**UGC AUTONOMOUS**

**IV–B.TECH–I–Semester End Examinations (Supply) - December- 2025**

**ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**

**(Common for ECE, CSE)**

**[Time: 3 Hours]**

**[Max. Marks: 70]**

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 20 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

**PART-A**

**(20 Marks)**

1. a) Define the terms Accuracy and Precision. [2M]
- b) Find the multiplying power of shunt of  $200\Omega$  resistance used with galvanometer of  $1000\Omega$  resistance. Determine the value of shunt resistance to give a multiplying power of 50. [2M]
- c) Formulate an equation for the measured value of total harmonic distortion. [2M]
- d) Where are spectrum analyzers commonly used? [2M]
- e) An electrically deflected CRT has a final anode voltage of 2000V and parallel deflecting plates 1.5cm long and 5 mm apart .If the screen is 50 cm from the centre of deflecting plates, Find the deflection sensitivity and the deflection factor of the tube. [2M]
- f) Why is a delay line important in a CRO? [2M]
- g) What is a Transducer? Give the classification of transducers. [2M]
- h) A resistance wire strain gauge uses a soft iron wire of small diameter .The gauge factor is +4.2. Neglecting the piezoresistive effects, Calculate the poisson's ratio. [2M]
- i) What resistance range must resistor  $R_3$  have in order to measure unknown resistor in the range 1-100K $\Omega$  using a Wheatstone bridge. Given  $R_1=1K\Omega$  and  $R_2=10K\Omega$ . [2M]
- j) Explain any three objectives of a Data Acquisition System. [2M]

**PART-B**

**(50 Marks)**

- 2.a) Explain the working of a basic DC voltmeter. How can its range be extended. [5M]
- b) Calculate the value of multiplier resistance on the 50V range of a dc voltmeter that uses a  $200\mu A$  meter movement with an internal resistance of  $100\Omega$ . [5M]

**OR**

- 3.a) Explain the different types of errors in measurement in detail. [5M]
- b) A  $100\Omega$  basic movement is to be used as an ohmmeter requiring a full-scale deflection of 1mA and internal battery voltage of 3V. A half-scale deflection marking of 2K is desired. Calculate (i) Values of  $R_1$  and  $R_2$  (ii) maximum value of  $R_2$  to compensate for a 5% drop in battery voltage. [5M]
4. Describe the circuits and working of wave analyzers used for audio frequency and megahertz range. [10M]

**OR**

5. What is Heterodyning and explain the use of Heterodyning in spectrum analyzer along with its circuit diagram. [10M]

6. Draw the circuit diagram of Sampling oscilloscope and explain its operation in detail. [10M]

**OR**

7. A CRT has an anode voltage of 2000V and parallel deflecting plates 2 cm long and 5mm apart. The screen is 30 cm from the centre of the Plates .Find the input voltage required to deflect the beam through 3 cm.The input voltage is applied to the deflecting plates through amplifiers having an overall gain of 100. [10M]

8. What is Piezo-electric effect? Explain the working principle of Piezo electric transducer in detail. [10M]

**OR**

- 9.a) Explain the working of resistance thermometer in detail. [5M]

- b) A platinum thermometer has a resistance of  $100\ \Omega$  at  $25^\circ\text{C}$  (a) Find its resistance at  $65^\circ\text{C}$  if the platinum has a resistance temperature co-efficient of  $0.00392/^\circ\text{C}$  (b) If the thermometer has a resistance of  $150\ \Omega$ , Calculate the temperature. [5M]

10. Explain the operation of Maxwell's Bridge and derive the condition for balance of a Bridge. [10M]

**OR**

11. Define and explain about Absolute humidity, Relative humidity, Specific humidity. Elaborate how humidity is measured. [10M]

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