

Duration: 3Hrs

[Max Marks:80]

N.B. : (1) Question No 1 is Compulsory.

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(2) Attempt any three questions out of the remaining five.

(3) All questions carry equal marks.

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(4) Assume suitable data, if required and state it clearly.

- 1 Attempt any FOUR [20]
- a How are instrumental errors different from gross errors?
  - b The expected value of the voltage across a resistor is 80 V. However , the measurement gives a value of 79 V. Calculate (i) absolute error, (ii) % error, (iii) relative accuracy and (iv) % of accuracy
  - c Compare sensor and transducer
  - d Define the following dynamic characteristics of instrument
    - (i) Speed of Response
    - (ii) Lag
    - (iii) Fidelity
    - (iv) Dynamic error
  - e Explain the function of delay line in CRO with neat diagram
- 2 a Explain with the help of a block diagram the operation of a spectrum analyzer. [10]  
state applications of a spectrum Analyzer
- b Explain various features of Digital Storage Oscilloscope [10]
- 3 a Explain how a Weins Bridge can be used to measure frequency? [10]
- b Voltmeter having a sensitivity of  $1000\Omega/\text{volts}$  read 100 V on its 150 V scale when connected across an unknown resistor in series with a millimeter, when millimeter reads 5mA [10]
- (i) Calculate apparent resistance of unknown resistor
  - (ii) Calculate actual resistance of unknown resistor
  - (iii) Calculate error due to loading effect of voltmeter.
- 4 a Explain the method of measuring displacement using LVDT. State the advantages and disadvantages of LVDT. [10]
- b Explain with the help of a block diagram the operation of the Digital Frequency meter. [10]
- 5 a Compare Maxwell's bridge and Hay's Bridge [10]
- b Explain the operation of Q-meter for measurement of high impedance values. [10]
- 6 a Explain how Lissajous patterns are used for measurement of an unknown frequency and phase shift using CRO. [10]
- b Choose the most suitable temperature transducer in each of the following: [10]
- (i) Rapid Changing temperature
  - (ii) Very small temperature changes about  $40^\circ\text{C}$
  - (iii) Very high temperature ( $>1500^\circ\text{C}$ )
  - (iv) Highly accurate temperature Measurement
  - (v) Wide temperature Variations

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