

Code No: RT41025

**R13**

**Set No. 1**

IV B.Tech I Semester Supplementary Examinations, February - 2019

**INSTRUMENTATION**

(Common to Electrical and Electronics Engineering and Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

*Question paper consists of Part-A and Part-B*

*Answer ALL sub questions from Part-A*

*Answer any THREE questions from Part-B*

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**PART - A (22 Marks)**

1. a) List out the dynamic characteristics of an instrument. [3]
- b) What are the properties of a passive transducer? [4]
- c) How strain can be measured? [3]
- d) What are the performance characteristics of digital voltmeters? [4]
- e) What is the function of vertical deflection plate in CRO? [4]
- f) Discuss the applications of Wave analyzers. [4]

**PART - B (3x16 = 48 Marks)**

2. a) Classify the different types of signals and explain them with an example of each. [8]
- b) The value of a resistance is  $5\text{ k}\Omega$ , while measurements yield a value of  $4.91\text{ k}\Omega$  calculate (i) relative accuracy of measurement (ii) percentage accuracy. [8]
3. a) Explain in detail about the factors to be considered while selecting a transducer. [8]
- b) Discuss in detail about the advantages and limitations of Thermistor. [8]
4. a) Explain in detail about the advantages and disadvantages of magnetic flow meter. [8]
- b) Explain in detail about the principles used in torque measuring transducers. [8]
5. a) With the help of a block diagram, explain the operation of a microprocessor based ramp type digital voltmeter. [8]
- b) A  $3\frac{1}{2}$  digital voltmeter has an accuracy of  $\pm 0.5\%$  of reading  $\pm 1$  digit. What is the possible error in volts when the instrument is reading  $4\text{ V}$  on the  $10\text{ V}$  range? What is the possible error in volts while reading  $0.12\text{ V}$  on the  $10\text{ V}$  range? [8]
6. a) Draw the block diagram of sampling oscilloscope and explain the working. [8]
- b) The Lissajous pattern on a CRO is stationary and has five horizontal and two vertical tangencies. The frequency of horizontal input is  $600\text{ Hz}$ . Determine the frequency of vertical input and draw the pattern. [8]
7. a) Explain the operation of Heterodyne Wave analyzer with the help of its block diagram. [8]
- b) Discuss in detail about Peak reading voltmeters along with its significance. [8]