

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

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 k Ω , while measurements yield a value of 4.91 k Ω 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 ½ digital voltmeter has an accuracy of $\pm 0.5\%$ of reading ± 1 digit. What is the possible error in volts when the instrument is reading 4 V on the 10 V range? What is the possible error in volts while reading 0.12 V on the 10 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 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]