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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Third Semester, B.E. - Industrial and Production Engineering

Semester End Examination; Dec - 2016/Jan - 2017

Mechanical Measurements

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. Describe the resistive transducers. 10
- b. With sketches, explain Piezo-electric effect and modes of operation of Piezo-electric crystals. 10
- 2 a. Describe briefly the various inherent problems associated with mechanical intermediate modifying system. 10
- b. Considering an example, explain briefly the telemetering system. 10

UNIT - II

- 3 a. With a neat sketch, explain briefly the working principle of direct writing styles type oscillograph. Also list out the difference between oscillographs and oscilloscope. 10
- b. What are Terminating devices? Explain briefly the basic mechanism of a mechanical counter. 10
- 4 a. Explain briefly the working principle of a Proving ring. 10
- b. With a neat sketch, explain briely the working principle of Hydrualic dynamometers. 10

UNIT - III

- 5 a. Describe briefly the bonded and un-bonded type strain gauges with neat sketches. 10
- b. Explain gauge factor. Describe briefly the steps involved in mounting of strain gauges. 10
- 6 a. Explain with a neat sketch, Piezo resistive type strain gauge. 10
- b. Describe with neat sketch, the working principle of Tuckerman Optical Extensometer. 10

UNIT - IV

- 7 a. With neat sketch, explain the working principle of Piezo-electric accelerometer. 10
- b. Explain the different equation of motion for vibration measuring devices. 10
- 8 a. Describe the use of elastic members in the measurement of pressure. 10
- b. With a neat sketch, explain the working principle of Mc leod gauge. 10

UNIT - V

- 9 a. List the different devices used for the measurement of temperatures. With a neat sketch explain the working principle of Bimetallic and pressure thermometers. 10
- b. What are thermocouples? Explain briefly the principle of operation of thermocouples. 8
- c. Explain briefly the different junctions of a thermocouple. 2
- 10 a. With a neat sketch, explain electrical resistance thermometer. 10
- b. Describe the construction and working principle of radiation pyrometer. 10