



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

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| 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

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| 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

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| 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

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| 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 Mcleod gauge. | 10 |

UNIT - V

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| 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 |