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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. - 2014**

### Mechanical Measurements

*Time: 3 hrs*

*Max. Marks: 100*

**Note :** i) Answer **FIVE** full questions, selecting **ONE** full question from each Unit.  
ii) Assume suitable missing data if any.

#### Unit - I

- |       |  |    |
|-------|--|----|
| 1. a. | With a neat sketch explain variable resistance transducers.                          | 5  |
|       | b. With a neat sketch explain the following: i) LVDT      ii) Ionization Transducers | 15 |
| 2. a. | List and explain any two problems in mechanical intermediate devices.                | 10 |
|       | b. With a neat block diagram explain telemetering transmitting system.               | 10 |

#### Unit - II

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|-------|---|----|
| 3. a. | With a neat sketch explain vacuum tube voltmeter.                   | 10 |
|       | b. Explain with a neat sketch list beam oscillograph.               | 10 |
| 4. a. | With a neat sketch explain working principle of a platform balance. | 10 |
|       | b. Explain with a sketch hydraulic dynamometer.                     | 10 |

#### Unit - III

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|-------|---|----|
| 5. a. | Explain the calibration of Bonded electrical resistance strain gauge.                 | 8  |
|       | b. Explain methods of temperature compensations in resistance type strain gauges.     | 8  |
|       | c. List the factors to be considered in the selection of grid materials.              | 4  |
| 6. a. | Derive the expression for gauge factor of a strain gauge in terms of Poisson's ratio. | 10 |
|       | b. Explain with a neat sketch a mechanical type of strain gauge.                      | 10 |

#### Unit - IV

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|-------|--|----|
| 7. a. | With a neat sketch explain types of elastic pressure transducers.  | 10 |
|       | b. With a neat sketch explain McLeod gauge.                        | 10 |
| 8. a. | Explain with a neat sketch Pirani type thermal conductivity gauge. | 10 |
|       | b. Describe with a neat sketch bulk modulus pressure gauge.        | 10 |

#### Unit - V

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|--------|--|---|
| 9. a.  | Explain the laws of thermo couples.                          | 8 |
|        | b. List the difference between resistance thermometers.      | 6 |
|        | c. List the materials used for construction of thermocouple. | 6 |
| 10. a. | Describe the construction & working of optical pyrometer.    | 8 |
|        | b. With a neat sketch explain resistance thermo meter.       | 7 |
|        | c. Write a note on Bi metallic thermo meters.                | 5 |