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BIMEE-015

B.Tech. – VIEP – MECHANICAL ENGINEERING (BTMEVI)

00236

Term-End Examination

June, 2016

BIMEE-015 : INDUSTRIAL MEASUREMENT AND QUALITY CONTROL

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. All questions carry equal marks.*

1. (a) Explain the functions of a mechanical strain gauge with a neat sketch. 7

(b) How do you measure the stress by photoelastic method ? Explain with suitable illustrations. 7

2. (a) A 100 Ω strain gauge is bonded to a low carbon steel bar which has been subjected to a tensile load. The bar has a preload uniform cross-sectional area of $0{\cdot}5 \times 10^{-4}$ m^2 and Young's modulus for low carbon steel is 200 GN/m^2. If a load of 50 kN produces a change of 1 Ω in the gauge resistance, determine the gauge factor for the strain gauge. 7

(b) What are the methods used to measure vibrations ? Explain any one method. 7

3. (a) Explain the causes of vibration in machines. What are their harmful effects and remedies ? 7

(b) Explain any one method for non-contact type speed measurement. 7

4. (a) Describe with a neat sketch, the working of an optical pyrometer. 7

(b) How is temperature error eliminated in a strain gauge bridge ? Explain with a suitable diagram. 7

5. (a) Describe the function of an absorption spectrometer with a suitable diagram. 7

(b) What are the methods used for level measurement ? What is the difference between direct and indirect methods of level measurement ? Explain with suitable examples. 7

6. (a) Discuss the basic characteristics and dynamics of the measurement. 7

(b) How do you classify the transducers ? Explain the working of a hydropneumatic transducer. 7

7. Write short notes on any ***four*** of the following : $4 \times 3\frac{1}{2} = 14$

(a) Mechano-Electrical Transformation

(b) Solid Level Indicator

(c) Thermistors

(d) Accelerometers

(e) Strain Gauge Rossette

(f) Force Sensor