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BIMEE-015

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

Term-End Examination

December, 2014

00695

BIMEE-015 : INDUSTRIAL MEASUREMENT AND QUALITY CONTROL

Time : 3 hours *Maximum Marks : 70*

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

1. (a) A strain gauge having a gauge factor 2·2 is mounted on a tensile specimen. The resistance before and after loading is 119·8 Ω and 120 Ω respectively. Taking modulus of elasticity as 200 GPa, calculate (i) Strain (ii) Stress. 7

(b) Four strain gauges each with nominal resistance 120 Ω are formed into a bridge with only one active gauge. If the gauge factor is 2·1 and supply voltage is 10 V, calculate the strain when the output from the bridge is 20 mV. 7

2. (a) Define vibration. Explain the need for measuring vibration. 7

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

3. (a) How are thermistors used in temperature measurement ? Explain in brief, the working of optical pyrometers. 7

(b) Describe the working principle of a thermo-couple. How is a thermo-couple used for the measurement of temperature ? Explain. 7

4. (a) Explain the following terms with respect to spectrum analyser : Dynamic Range and Resolution Bandwidth. 7

(b) Explain the working of absorption spectrometer. 7

5. (a) List the various types of position sensors. Discuss the significance of these sensors in level measurement. 7

(b) Differentiate between the systemic and random errors involved in measurement. Name the typical sources of these errors. 7

6. (a) Why is calibration required ? Write the steps involved in the calibration of any instrument. 7

(b) Describe the static and dynamic characteristics of measuring instruments. 7

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

(a) Functional elements of a measuring instrument

(b) Peltier Effect

(c) I.R. based pyrometers

(d) Mechano-electrical transformation