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BIMEE-015

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

00942 **Term-End Examination**

December, 2017

BIMEE-015 : INDUSTRIAL MEASUREMENT AND QUALITY CONTROL

Time : 3 hours *Maximum Marks : 70*

Note : *Answer any **five** questions. All questions carry equal marks. Use of scientific calculator is permitted.*

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

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

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

(b) Explain the causes of vibrations in machines. What are their harmful effects and remedies ? 7

3. (a) Name various types of instruments used for speed measurement. Explain the working of a magnetic tachometer. 7

(b) Explain the following terms in the context of a measuring instrument with appropriate examples : 7

(i) Precision

(ii) Sensitivity

(iii) Resolution

(iv) Repeatability

4. (a) Explain any one method of non-contact type temperature measurement. 7

(b) A thermocouple system with a time constant of 8 seconds has been used to measure the temperature of a furnace whose temperature fluctuates sinusoidally between 400°C and 450°C with a periodic time of 60 seconds. Determine the maximum and minimum values that will be indicated by the thermocouple. Calculate the phase angle and corresponding time lag between the temperature signals and the thermocouple output signals. 7

5. (a) Name the different types of transducers. Explain any one of them in detail with a neat sketch. 7

(b) Explain the basic principle of absorption spectrometer upon which it is designed. Also mention its significant characteristics. 7

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

(b) How are thermistors used in temperature measurement ? Explain in brief. 7

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

(a) Force Sensors

(b) Solid Level Indicator

(c) Accelerometers

(d) Thomson Effect

(e) Photoelastic Method

(f) Dynamic Range and Resolution Bandwidth
