(Following Roll No. to be filled by candidate)

Roll No. | 1 | 2 | 0 | 4 | 3 | 5 | 1 | 9 | 0 | 2 |

B. TECH.

FIFTH SEMESTER EXAMINATION 2013-14

ECH 504

PROCESS INSTRUMENTATION

Time: 2 Hours Max. Marks: 50

Note:

- Attempt all questions.
- Marks and number of questions to be attempted from the section is mentioned before each section.
- Assume missing data suitably. Illustrate the answers with suitable sketches

1. Attempt any ***Four*** parts of the following: [4×3]

   a. Describe a McLeod gauge and derive the expression for the unknown pressure. Give its advantages and disadvantages.

   b. Explain the working principle of radiation pyrometer with the help of a neat diagram.

   c. Describe the dynamic response of second order type instruments with suitable examples and diagrams.

   d. Discuss the principle, construction and operation of inclined-tube manometer with the help of a neat diagram.

   e. Discuss the theory and construction of bimetallic thermometers with their applications.

   f. Describe first-order type instruments with suitable examples.

2. Attempt any ***Two*** parts of the following: [2×6]

   a. Describe the design procedure of pressure transducers with their characteristics and applications.

   b. What are the functional elements in a measuring system? Explain the theory and construction of Pirani Gauge with their applications and advantages.

   c. Explain 'Arithmetic Mean Method' of evaluating the data. Also describe various types of 'errors' encountered during the evaluation of performance parameters in a system.

3. Attempt any ***Two*** parts of the following: [2×6]

   a. Discuss the working principle of 'Efflux' type viscometer. Also describe the procedure of measurement of viscosity using this principle commonly used in industry.

   b. Give the various devices for measuring of liquid level. Discuss any one method for measuring liquid level in a closed vessel with neat diagram.

   c. Differentiate between variable head type and variable area type flow meters. Write their advantages and limitations.

4. Attempt any ***Two*** parts of the following: [2×7]

   a. Describe the principle and working of a Mass Spectrometer with its application in industry.

   b. Define industrial method of measurement of *pH*? Explain the principle of measurement and construction of the instrument with the help of a neat diagram.

   c. Enumerate the methods for determining quantitatively the composition of gases. Also discuss the principle, construction and operation of thermal conductivity cell with the help of a neat diagram.