

Q.P. CODE: 36220

Duration: 3 Hours

Total Marks : 80

Note:

1. Question one is compulsory.
2. Solve any three from remaining
3. Assume suitable data wherever necessary.



- Q1. Attempt any five** 20
- a. Compare repeatability and reproducibility.
 - b. Classify transducers with example of each.
 - c. What do you mean by calibration? What is need of calibration?
 - d. Explain the elements of the measurement system.
 - e. Distinguish between direct and indirect methods of level measurement with example of each of these methods.
 - f. Explain self-heating effect and sensitivity with respect to RTD.
- Q2. a** Describe absolute encoder and incremental encoder with its applications. 10
- Q2. b** Discuss the role of National Physical Laboratory in metrology. 10
Write its advantages and disadvantages.
- Q3.a** Explain ultrasonic liquid level measurement system with its advantages. 10
- Q3.b.** Explain angular displacement using capacitive transducer. 10
- Q4.a.** A thermistor has a resistance of 3980 Ω at the ice point (0°C) and 790 Ω at 50°C . The resistance-temperature relationship is given by $R_T = a R_0 \exp (b/T)$. 10
i) calculate the constants a and b
ii) Calculate the range of resistance to be measured in case the temperature varies from 40°C and 100°C .
- Q4.b.** List different methods of humidity measurement and explain any one in detail. 10
- Q5.a.** The power radiated from a hot piece of metal was measured by the radiation pyrometer and the temperature was determined as 820°C assuming a surface emissivity of 0.75. Later it was found that the accurate value of emissivity was 0.69. Find the error in the temperature determination. 10
- Q5.b.** Describe the different types of compensations used in thermocouples and also the methods of measurement of their output voltage. 10

- Q6.a. Explain the construction and principle of working of a linear voltage differential voltage transformer (L.V.D.T). Explain how the magnitude and direction of the displacement of core of an L.V.D.T detected. 10
- Q6.b. Describe the working and construction of resistance thermometers. Describe the materials used for RTDs, along with their properties and typical characteristics. 10

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