

MARKS – 80

TIME 3 hrs.

Instructions:

- 1) **Question no. 1 is compulsory.**
- 2) Attempt any three questions from the remaining questions.
- 3) Assume suitable data wherever required.

- Q.1 Answer in brief (any Five) (20)
- a) Compare accuracy and precision with suitable example.
 - b) Classify transducers with example of each.
 - c) What do you mean by calibration? What is need of calibration?
 - d) Explain cold junction compensation in thermocouples.
 - e) Explain the working principle of bubbler type level-gauge.
 - f) Distinguish between direct and indirect methods of level measurement with example of each of these methods.
- Q.2a) Discuss the role of National Physical Laboratory in metrology. Write its advantages and disadvantages. (10)
- b) Explain ultrasonic liquid level measurement system with its advantages. (10)
- Q.3) Draw and explain the block diagram of generalised measurement system. (10)
- b) A thermistor has a resistance of 3980Ω at the ice point (0°C) and 790Ω 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 50°C and 100°C .
- Q.4 a) List different methods of humidity measurement and explain any one in detail. (10)
- b) State different types of pyrometers. Explain with a neat sketch any one of them. (10)
- Q.5 a) Compare RTD, thermistor and thermocouple on the basis of--- (10)
- i) Working Principle
 - ii) Sensitivity
 - iii) Linearity
 - iv) Ranges
 - v) Applications.
- b) The output of a LVDT is connected to 5V voltmeter through an amplifier whose amplification factor is 200. An output of 2 mV appears across the terminals of LVDT when core moves through a distance of 0.5mm. Calculate sensitivity of the LVDT and that of the whole setup. The millivoltmeter scale has 100 divisions. The scale can read of 1/5 of division. Calculate the resolution of the instrument in mm. (10)
- Q.6 a) Write short note on Encoders. (10)
- 6 b) Explain the law of intermediate temperatures and law of intermediate metals in case of thermocouple and give its significance (10)
