



(3 Hours)

[Total Marks :80

- N.B. :** (1) Question No.1 is compulsory.
 (2) Attempt any **three** from the remaining questions.
 (3) Assume suitable data wherever required and state the assumptions.

1. Answer in brief (any Four) 20
- Define transducer and state their classification.
 - Explain working of Bimetallic thermometer.
 - Define metrology and write its significance.
 - Distinguish between direct and indirect methods of level measurement with example of each of these methods.
 - Justify- LVDT can be used as primary as well as secondary transducer.
2. (a) Explain the law of intermediate temperatures and law of intermediate metals in case of thermocouple and give its significance. 10
 (b) Draw and explain any one method of humidity measurement. 10
3. (a) Potentiometer having resistance of 2500Ω is rated as 2W power. Find maximum allowable excitation voltage? Calculate resolution and sensitivity if the length of potentiometer is 0.1m and number of turns are 150. Calculate % loading error of 0.67 at the travel, if meter is connected across the potentiometer. 10
 (b) State different types of encoders. Explain with a neat sketch any one of them. 10
4. (a) Explain working principle of capacitive transducer. Draw and explain different methods to vary capacitance. 10
 (b) Explain linear and rotary displacement measurement techniques. 10
5. (a) A thermistor has a resistance of 3980Ω at the ice point (0°C) and 794Ω at 50°C . The resistance-temperature relationship is given by $R_T = a R_0 \exp(b/T)$.
 (i) calculate the constants a and b 10
 (ii) Calculate the range of resistance to be measured in case the temperature varies from 40°C and 100°C .
 (b) Explain different types of errors in measurements with their remedies. 10
6. Write short notes: (Any Two) 20
- Lead wire compensation in RTD.
 - Sound pressure Level (SPL) meter
 - Strain gauge