

(3 Hours)



Total Marks : 80

- N. B. : (1) Question No. 1 is compulsory.
 (2) Solve any three questions from the remaining questions.
 (3) Assume suitable data if required and state it clearly.

1. Solve any five : 20
- (a) What is base metal and rare metal thermocouples ? State their advantages and disadvantages.
- (b) What is metrology ? What is the need of inspection ?
- (c) What is residual voltage in case of LVDT ? How it is minimised ?
- (d) Explain the principle of radiation type level measurement.
- (e) Define : - (i) Linearity (ii) Sensitivity (iii) Resolution
 (iv) Accuracy.
- (f) What do you mean by relative and absolute humidity ?
2. (a) Explain the construction and working principle of LVDT. 10
 (b) For a type R thermocouple the outputs are 14.629 mV and 0 mV corresponding to 1300°C and 0°C respectively. Find the mV output when the cold junction is maintained at 30°C. With cold junction at 20°C and the mV output 10.5 mV in a particular measurement, determine the actual temperature of the measurement point. 10
3. (a) Draw and explain the schematic block diagram of hair hygrometer. 10
 (b) If $R_1 = (200 \pm 20) \Omega$, $R_2 = (50 \pm 8.08) \Omega$, and $R_3 = (100 \pm 5) \Omega$. Calculate the equivalent resistance and limiting errors if they are connected in series and parallel combination. 10
4. (a) Discuss the role of NPL in metrology. Write its advantages and activities. 10
 (b) Explain selective radiation pyrometer. Also state its temperature range. 10
5. (a) Explain use of potentiometer for displacement measurement. 10
 A linear resistance potentiometer is 50 mm long and is uniformly wound with a wire having a resistance of 10,000 Ω under normal condition. The slider is at the centre of pot. Find the linear displacement when the resistance of pot is measured by Wheatstone's bridge for two cases. (i) 3850 Ω (ii) 7560 Ω . Are the two displacements in a same direction? If it is possible to measure a minimum value of 10 Ω resistance with the above arrangement. Find the resolution of the pot in mm.
 (b) State and explain the methods of solid level measurement. 10
6. (a) State and explain laws of intermediate temperature and intermediate metals. Write the significance of these laws. 10
 (b) Draw and explain block diagram of generalised measurement system. 10
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