07·12·17   Q. P. Code: 24140

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 3980 Ω at the ice point (0°C) and 790 Ω at 50 °C.   (10)
The resistance-temperature relationship is given by $R_T = a R_0 \exp(b/T)$.
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   iv) Ranges
ii) Sensitivity   v) Applications.
iii) Linearity

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 milivoltmeter 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)

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