NATIONAL INSTITUTE OF TECHNOLOGY, CALICUT

DEPARTMENT OF CHEMICAL ENGINEERING

III YEAR B.TECH CHEMICAL ENGINEERING- SEMESTER-V

Test Series II, Monsoon 2014

CH3004-PROCESS INSTRUMENTATION

Maximum marks: 20

Answer the following Questions

Missing datas may be suitably assumed

1. How temperature scale has been standardized? What are fixed points and how are they used in temperature standards? (2)

2. Where bimetallic elements are used as temperature sensors and where as compensating elements? Discuss and explain with neat sketches. (2)

3. What are the error possibilities in resistance thermometer? How to rectify the errors. (2)

4. Explain in detail the working operation of radiation thermometer with neat sketch. (2)

5. Elucidate the laws of thermocouple behavior. (2)

6. What are thermistors? How are they constructed? (2)

7. A certain target has a brightness temperature of 1000 K when viewed by a vanishing filament pyrometer. The target emissivity at 0.66 μm is known to be 0.8. What is the true temperature of the target? What is the colour temperature of the same target if $\lambda_1 = 0.66$ μm, $\lambda_2 = 0.5$ μm, $\varepsilon_{\lambda 2} = 0.50$. (3)

8. A platinum resistance thermometer is used to measure temperature between 0^0 and 350^0C. Given that resistance at t^0C as $R_t = R_0 (1+\alpha t+\beta t^2)$ and $R_0 = 150\ \Omega$, $R_{150} = 220.60\Omega$ and $R_{350} = 260.38\Omega$, calculate the nonlinearity at 150^0C as a per cent of full – scale deflection. (3)

9. Compare the temperature range, thermal response and stability of thermocouple, thermistor and RTD? (2)

Scrutinized
Aparna.M
13/10/14