Chemistry 236 -- Quiz 2

September 12, 2007 — Calibration

Pledge and signature:

Note: If you want your paper returned folded (*i.e.*, score concealed), please print your name on the back.

1. (6) Linear relations are golden in science, as they permit straight-line presentation and analysis of data. For each of the two devices we will calibrate, we can express the relation between the measured property and the desired property as $y = a + bx$, where a and b are calibration parameters. What are "y" and "x" here if this relation is used for our two devices. Be specific in identifying each quantity, *i.e.*, name them and give units, don't just give symbols.

   Baratron gauge:` **SEE CLASSPAK AND LAST WEEK'S LECTURE**

   Thermistor:

2. (3) A quantity is known to follow a linear relationship, $y = a + bx$. If $y = -1.5$ when $x = 0.2$ and $y = 85.5$ when $x = 8.9$, what are the values of a and b?

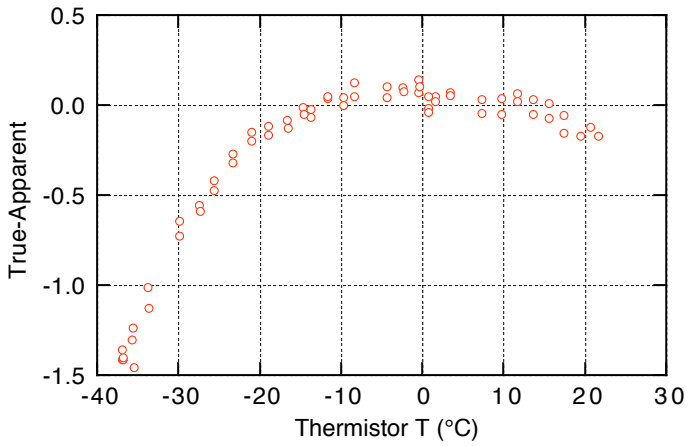
   a. $a = -2.5$; $b = 5.0$ b. $a = -3.5$; $b = 10.0$ c. $a = -4.0$; $b = 12.7$
   d. $a = -4.1$; $b = 13.0$ e. none of these

3. (2) A particular thermistor has a resistance of 5.0 kΩ at 0°C. Its resistance at 200° C must be

   a. higher b. lower c. can't tell without knowing the sign of ΔE.

4. (3) Calibration data for a thermistor are as shown in the accompanying graph. If the true temperature is –30.0°C, what does the thermistor read?

   a. –30.0°C b. –30.7°C
   c. –29.3°C d. –0.7°C
   e. This cannot be determined without additional information.



5. (2) It is generally satisfactory to correct Hg manometer and barometer readings by taking into account just the Hg thermal expansivity. If the *linear* thermal expansion coefficient is $\alpha = 6.0 \times 10^{-5}$ K^{-1}, how large must the manometer reading be for the magnitude of the correction to be 1.0 Torr when $t = 20$°C?

   a. –833 Torr b. 278 Torr c. 833 Torr d. 5.56×10^3 Torr e. 1.67×10^4 Torr