Name: _____ Block: _____

Thermal Expansion

1. A brass rod is 27.50 cm long at 25°C. How long would the rod if it were heated to 750. °C in a flame?

27.88 cm

2. A steel bridge is 625 m long when the temperature is 0°C. If the bridge did not have any expansion joints, how much longer would the bridge be on a hot summer day when the temperature is 35°C? (Use the linear coëfficient of expansion for iron.)

0.258 m

   Why do bridges need expansion joints?

3. A sample of air has a temperature of 40.0°C and occupies a volume of 2.30 ℓ. At what temperature would it occupy a volume of 6.50 ℓ?

885 K
612°C

4. A sample of argon gas was cooled, and its volume went from 380. mℓ to 250. mℓ. If its final temperature was −45.0°C, what was its original temperature?

347 K
74°C

5. A 15.00 cm long bimetal strip is aluminum on one side and copper on the other. If the two metals are the same length at 20.0°C, how long will each be at 800.°C?

15.199 cm

6. A glass volumetric flask holds exactly 250.00 mℓ at 20.0°C.

   (a) What volume would the flask hold at 50.0°C?

250.19 mℓ

   (b) Suppose the flask is filled with water at 50.0°C. If the volume of the water had been 250.00 mℓ at 20.0°C, what volume would the water have at 50.0°C?

251.55 mℓ

   (c) Suppose instead that the flask is empty (which really means that it's full of air). If the air inside is heated from 20.0°C to 50.0°C, what would the new volume of the air be?

275.6 mℓ