Name: _____ Date: _____ Course: _____ Professor: _____

T4a Prelab (1007): Thermal Expansion

Read lab instructions before answering the questions

1. Bob is an engineering student who has designed a bridge made completely out of steel. The bridge is 1000 m long at the lowest recorded temperature in the area T = -40 °C. Bob knows that the coefficient of linear expansion for steel is $\alpha = 12 \times 10^{-6}$ °C^{-1}. If the highest recorded temperature in the area is T = 40 °C, how much should Bob expect the bridge to expand?

2. Bob built a scale model of the bridge that is 2.450 m long at the lowest temperature (T = -40 °C) using an unknown material. When the temperature reaches the highest value (T = 40 °C), he measures again the length of the bridge finding that it has expanded ΔL = 4.70 mm. Calculate the coefficient of linear expansion and find the material Bob used to make his model.