

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 900 m long at the lowest recorded temperature in the area $T = -30\text{ }^{\circ}\text{C}$. Bob knows that the coefficient of linear expansion for steel is $\alpha = 12 \times 10^{-6}\text{ }^{\circ}\text{C}^{-1}$. If the highest recorded temperature in the area is $T = 30\text{ }^{\circ}\text{C}$, how much should Bob expect the bridge to expand?

2. Bob built a scale model of the bridge that is 1.500 m long at the lowest temperature ($T = -30\text{ }^{\circ}\text{C}$) using an unknown material. When the temperature reaches the highest value ($T = 30\text{ }^{\circ}\text{C}$), he measures again the length of the bridge finding that it has expanded $\Delta L = 1.08\text{ mm}$. Calculate the coefficient of linear expansion and find the material Bob used to make his model.