___ 1 A 240 g piece of lead is heated to 100.0 °C and is then placed in a 400 g copper container holding 500 g of water. The specific heat of copper is $c = 0.386\,\mathrm{kJ/\,kg\,K}$. The container and the water had an initial temperature of 18.0 °C. When thermal equilibrium is reached, the final temperature of the system is 19.2 °C. If no heat has been lost from the system, what is the specific heat of the lead? (the specific heat of water is 4.180 kJ/kg K)

A) $0.139\,\mathrm{kJ/\,kg\,K}$ B) $0.236\,\mathrm{kJ/\,kg\,K}$ C) $0.153\,\mathrm{kJ/\,kg\,K}$ D) $0.125\,\mathrm{kJ/\,kg\,K}$ E) $0.180\,\mathrm{kJ/\,kg\,K}$

../chapter18-tex-new/PLIN/chapter18-011.plin

___ 2 A block of mass 0.200 kg slides across a rough horizontal surface with coefficient of kinetic friction $\mu_k = 0.500$. What is the change in entropy after the block has moved a distance of 2.00 m? The temperature of the block and surrounding is 21 °C. ($g = 9.8\,\mathrm{m/\,s^2}$)

A) $13.3 \times 10^{-3}\,\mathrm{J/\,K}$ B) 0 C) $12.0 \times 10^{-3}\,\mathrm{J/\,K}$
D) $6.67 \times 10^{-3}\,\mathrm{J/\,K}$ E) $3.33 \times 10^{-3}\,\mathrm{J/\,K}$

../chapter19-tex-new/PLIN/chapter19-058.plin

___ 3 A clock pendulum made of aluminum, which has a coefficient of linear expansion of $24.0 \times 10^{-6}\,\mathrm{K^{-1}}$, has a period of exactly 1 s at 18 °C. Before a homeowner leaves town for one week, e turns the thermostat down to 10°C. When e returns, the clock is

A) exactly on time. B) slow by 58 s C) slow by 116 s
D) fast by 58 s E) fast by 116 s

../chapter20-tex-new/PLIN/chapter20-003.plin

___ 4 The coefficient of thermal expansion of water at 20 °C is $0.207 \times 10^{-3}\,\mathrm{K^{-1}}$. A thin glass tube contains a 75 cm column of water at 20 °C. If the thermal expansion of the glass tube is negligible, by how much does the length of the column of water expand when it is heated to 90 °C?

A) 21.7 mm B) 54.3 mm C) 10.9 mm D) 43.5 mm E) 32.6 mm

../chapter20-tex-new/PLIN/chapter20-009.plin

___ 5 The dimensionless length L of an object varies with dimensioless temperature T according to a mathematical function $L(T)$ defined by $T \mapsto 4\,T^2 + 2\,T + 3$ [Note: $x \mapsto f(x)$ indicates the function that produces output $f(x)$ for input x.] The coefficient of linear expansion of this object is given by the following function:

A) $T \mapsto 8\,T + 2$ B) $T \mapsto \frac{2\,(4\,T+1)}{4\,T^2+2\,T+3}$ C) $T \mapsto \frac{4\,T^3+3\,T^2+9\,T}{3\,(4\,T^2+2\,T+3)}$ D) $T \mapsto \frac{4}{3}\,T^3 + T^2 + 3\,T$
E) $T \mapsto 8 \quad T/L$

../chapter20-tex-new/PLIN/chapter20-017.plin

___ 6 In operation an aluminum flywheel within an engine gearbox increases its temperature by T °C. Assuming the flywheel to be a uniform circular disk, calculate the percentage change in the moment of inertia of the flywheel. (Coefficient of linear expansion for Al $= 24 \times 10^{-6}/\,\mathrm{K}$.)

A) 0.34% B) 0.048% C) 0.096% D) 0.19% E) 0.29%

../chapter20-tex-new/PLIN/chapter20-019.plin