

Physics 102Rec

Quiz # 3

Chapter 19

ate: 17 March 2002

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1. How many calories are required to change one gram of  $0^\circ\text{C}$  ice to  $100^\circ\text{C}$  steam? The latent heat of fusion is  $80\text{ cal/g}$  and the latent heat of vaporization is  $540\text{ cal/g}$ . The specific heat of water is  $1.00\text{ cal/g} \times \text{K}$ .

$$0^\circ\text{C ice} \xrightarrow{Q_1} 0^\circ\text{C water} \xrightarrow{Q_2} 100^\circ\text{C water} \xrightarrow{Q_3} 100^\circ\text{C steam}$$

$$Q_{\text{net}} = Q_1 + Q_2 + Q_3 = mL_f + mc\Delta T + mL_v$$

$$= (1)(80) + (1)(1)(100) + (1)(540) = \boxed{720\text{ cal}}$$

2. A gas is taken through the cyclic process described in the figure. Find the net heat, in joules, transferred during one complete cycle.

$$Q = W \quad (\text{because } \Delta E_{\text{int}} = 0)$$

$$= \text{Area enclosed}$$

$$= -\frac{1}{2}(1)(2) \times 1.013 \times 10^5 \times 10^{-3}$$

$$\boxed{Q = -1.013 \times 10^2\text{ J}}$$

