

## CALORIMETRY PROBLEMS

### EQUATIONS

for an object dropped into water, i.e., a calorimeter problem

$$Q_{\text{water}} = m_{\text{water}} \times C_{\text{water}} \times \Delta T_{\text{water}} \quad \text{and} \quad Q_{\text{metal}} = m_{\text{metal}} \times C_{\text{metal}} \times \Delta T_{\text{metal}}$$

$$\text{and} \quad Q_{\text{water}} = -Q_{\text{metal}}$$

Therefore...

$$(m_{\text{water}})(C_{\text{water}})(\Delta T_{\text{water}}) = \quad .$$

- 1) Calculate the specific heat of a metal if  $2.36 \times 10^2$  grams of it at  $99.5^\circ\text{C}$  is added to 125.0 mL of water at  $22.0^\circ\text{C}$ . The final temperature of the system is  $25.4^\circ\text{C}$ .
- 2) A lump of chromium (Cr) has a mass of 95.3 grams and a temperature of  $90.5^\circ\text{C}$ . It is placed into a calorimeter with 75.2 mL of water at  $20.5^\circ\text{C}$ . After stirring, the final temperature of the water, Cr metal, and calorimeter is  $28.6^\circ\text{C}$ . What is the specific heat of Cr metal?
- 3) A 100.0 gram sample of water at  $50.0^\circ\text{C}$  is mixed with a 50.00 gram sample of water at  $20.0^\circ\text{C}$ . What is the final temperature of the 150.0 grams of water?