

BAE 103
Energy in Biological Systems

Problem Set No. 7
Concepts of Heat Capacity
Due Date: Monday, February 19

- 7.1 A twelve pack of your favorite beverage (12 fl. oz. cans) is placed in a cooler at 70° F. How much heat must be removed (Btu's) to cool the beverages to 37° F?
- 7.2 Seven pounds of ice at 20° F is placed in the cooler with the beverages in problem 8.1. Assume no heat is gained from the environment outside of the cooler. What is the equilibrium temperature (°F) of the beverages and the ice?
- 7.3 If the rate of heat gained by the cooler (in problems 8.1 and 8.2) from the surrounding environment is 50.0 Btu/hr., how long (hr.) will the ice in the cooler last? Assume the beverages are placed in the cooler at 32°F.
- 7.4 A runner consumes 1.0 L of water during an event. What has a greater cooling influence on the human body, the cold temperature of the water (5° C), or evaporation of this water from the skin of the runner? Justify your answer with supporting calculations.