Honors Chemistry: Thermochemistry 6- Calculating Energy of Phase Changes

Substance	m.p. (ºC)	ΔH_{fus} (kJ/g)	b.p. ºC	ΔH_{vap} (kJ/g)	Specific Heat –C- (J/g ºC)
H_2O	0.00	0.333	100.00	2.25	Ice: 2.09 Water: 4.18 Steam: 2.01
Grain Alcohol	-98	0.0987	64	1.10	Solid: 1.2 Liquid: 2.4 Gas: 1.9
Benzene	5.0	0.1265	80	0.394	Solid: 0.55 Liquid: 0.96 Gas: 1.09

1. If you must add 25 kJ to raise the temperature of an ice cube from -15°C to -10°C, is this an endothermic or an exothermic process.

2. How much heat is required to raise 40 grams of water from 30°C to 70°C? 6.7 kJ

3. How much water can be raised from 25°C (room temperature) to 37°C body temperature by adding the 2,000 kJ in a Snickers Bar? 39.9 L

4. How much heat does it take to melt 65 grams of ice at 0°C? 21.6 kJ

5. Calculate the amount of energy required to change 100 grams of solid ice at 0°C to gaseous steam at 100°C. How many steps does this take? 301 kJ

6. Calculate the amount of energy released by cooling 59 grams of liquid water from +25°C to ice at -25°C. How many steps does this take? 27.3 kJ

7. How much heat would it take to raise 5 grams of H_2O from -50°C to +200°C? How many steps does this take? 16.4 kJ

8. How much energy is required to bring 45 g of benzene from - 10˚C to 70˚C? 8.9 kJ