Phase Changes

	_	Name:
The following thermodynamic data was collected for methanol and ammonia:		
Substance	Ammonia	Methanol
Boiling Point (°C)	-33.5	64
Melting Point (^o C)	-78	-98
Heat of Fusion (J/g)	331	99.2
Heat of Vaporization (J/g)	1371	1103
Specific Heat of liquid (J/g ^o C)	4.75	2.55
Specific Heat of gas (J/g ^o C)	2.06	1.37

1) How much heat is absorbed as 100. g of methanol is heated from 0.0 °C to 100.0 °C?

2) How much heat is released as 15.0 g ammonia is cooled from 0.0 °C to -50.0 °C?

3) What is the specific heat of a 27.6 g sample increases temperature by 4.9 $^{\circ}$ C when 157.7 J of heat are added?

4) A 50 g piece of metal at 90 $^{\circ}$ C is placed in 250 g of methanol at 0 $^{\circ}$ C. The methanol is warmed to a temperature of 5 $^{\circ}$ C. What is the specific heat of the metal?

5) How much energy does a UV wave have with a wavelength of $3.86 \times 10^{-9} \text{ m}$?

Covalent

Phase Changes

Name: _____

1) How much energy is needed in order to heat 82.0 g of ice at -33 °C to water at 41 °C?

2) A 45.0 g sample of steam at 130 $^{\circ}$ C is cooled to 11 $^{\circ}$ C. How much heat would need to be removed in order to accomplish this?

3) 40.0 g of liquid ethanol is heated from 25 °C to the boiling point of ethanol at 78 °C, boiled into a gas and then heated to 100 °C. How much heat is needed for this? Ethanol properties: Liquid ethanol has a specific heat of 2.46 J/g °C; Gaseous ethanol has a specific heat of 2.61 J/g °C; The heat of vaporization of ethanol is 1310 J/g

4) How much heat is released when a reaction occurs in 109 g of water and the temperature of the water increases by $32.0 \text{ }^{\circ}\text{C}$?

5) What is the wavelength of a radio wave with a frequency of 1.65×10^7 Hz?