

Name: \_\_\_\_\_

Problem Set #1

1.) When 20 g of NaOH (MW = 40.0 g/mol) is dissolved in 80 g of water, the temperature rises from 20 °C to 85 °C, what is the heat released by this process? Given the specific heat of water is 4.184 J/g·°C, and using  $q = m \times C_s \times \Delta T$

2.) What is the change in enthalpy ( $\Delta H$ ) of this process? (Hint: units should be J/mol)

3.) What's the change in energy when an electron transitions from the  $n=5$  to the  $n=2$  quantum level in hydrogen? Using the provided equation, here  $hcR_H = 2.18 \times 10^{-18} \text{ J}$

$$\Delta E = -hcR_H \left[ \left( \frac{1}{n_f^2} \right) - \left( \frac{1}{n_i^2} \right) \right]$$

4.) What is the wavelength of light of the photon of light emitted during that transition from  $n = 5$  to  $n = 2$ ? Given  $E = h\nu$  and  $c = \nu\lambda$  where  $h = 6.626 \times 10^{-34} \text{ J} \cdot \text{s}$  and  $c = 3.0 \times 10^8 \text{ m/s}$