1A Exam 4 (Chapter 5; Bonus Chapter 6) Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ALL work must be shown in calculations & include units! Good luck! Relax!**

1. Calculate the number of times a 135lbs person would have to jump up 15.0cm after having eaten a 400. Calorie hamburger. (1kg = 2.21lbs; 1cal = 4.184J)
2. Consider the following reaction: 2CH3OH 🡪 2CH4 + O2 ∆H = +252.8 kJ
   1. Is this reaction endo or exothermic?
   2. Calculate the heat needed when 24.0 g of CH3OH is decomposed.
   3. Calculate the heat released when 38.5 grams of CH4 reacts completely with O2 to form CH3OH.
3. A 1.800 gram sample of phenol, C6H5OH, was burned in a bomb calorimeter whose heat capacity was 11.66 kJ/°C. The temperature of the calorimeter increased from 21.36 to 26.37°C. What is the enthalpy of the combustion reaction in kJ/mol. Label as endo or exothermic.
4. Use Hess’ Law to calculate the ∆Hrxn for: N2O + NO2 🡪 3NO.

(all equations must be re-written to show how they sum to the overall)

N2 + O2 🡪 2NO ∆H = +180.7kJ

2NO + O2 🡪 2NO2 ∆H = -113.1kJ

2N2O 🡪 2N2 + O2 ∆H = -163.2kJ

1. Combustion of 1mole of acetone, C3H6O, *releases* 1790kJ of heat:

C3H6O + 4O2 🡪 3CO2 + 3H2O

Calculate the enthalpy of formation for acetone given: ∆Hf CO2 = -393 kJ/mol and ∆Hf H2O = -241 kJ/mol.

BONUS 3:

1. Calculate the frequency of light released when an electron transitions from n = 5 to n = 4 in a hydrogen atom.
2. Clearly label the relationships between energy, wavelength, and frequency for low energy AND indicate the color of visible light that corresponds to this.

1A Exam 4 (Chapter 5; Bonus Chapter 6) Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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BONUS 3:

1. Calculate the frequency of light released when an electron transitions from n = 4 to n = 3 in a hydrogen atom.
2. Clearly label the relationships between energy, wavelength, and frequency for high energy AND indicate the color of visible light that corresponds to this.

POSSIBLE EQUATIONS