CHEM 130 **Name** _____
Quiz 7 – October 27, 2017

Complete the following problems. Write your final answers in the blanks provided.

1. Determine the ΔH^o for this reaction from the data below. (8 pts)

$$N_2 + 4H_2O \rightarrow N_2H_4 + 2H_2O_2$$

Reaction	ΔH^o
$N_2H_4 + O_2 \rightarrow N_2 + 2H_2O$	-622.2 kJ
$H_2 + ½O_2 \rightarrow H_2O$	-285.8 kJ
$H_2 + O_2 \rightarrow H_2O_2$	-187.8 kJ

Answer_____

2. You are planning to deep fry some Oreos by heating cooking oil in a pan on a natural gas stove. Your source of heat will be the combustion of natural gas (methane, molar mass 16.04 g/mol), shown below. What mass of methane must burn to heat 2.02 kg of cooking oil from 72°F (22.2°C) to 375°F (190.6°C) to make some delicious treats? The specific heat capacity of the cooking oil is 1.75 J/(g°C), the specific heat capacity of water is 4.184 J.(g°C). (9 pts)

$$CH_4(g) + 2O_2(g) \rightarrow CO_2(g) + 2H_2O(g) \quad \Delta H^o = -882.0 \text{ kJ}$$

Answer_____

3. The overall reaction for the combustion of benzene (C_6H_6) is shown below. Use the data in the table at the right to calculate ΔH^o_f of benzene. (8 pts)

$2\ C_6H_6(\ell) + 15\ O_2(g) \rightarrow 12\ CO_2(g) + 6\ H_2O(\ell)\quad \Delta H^o = -6535\ kJ$

Substance	**ΔH^o_f (kJ/mol)**
C(g)	**+716.7**
C(graphite)	**0**
CO(g)	**-110.5**
$CO_2(g)$	**-393.5**
H(g)	**+218.0**
$H_2(g)$	**0**
$H_2O(g)$	**-241.8**
$H_2O(\ell)$	**-285.8**
O(g)	**+249.2**
$O_2(g)$	**0**
$O_3(g)$	**+142.7**

Answer_____

Possibly Useful Information

$KE = \frac{1}{2}mv^2$	$K = {}^oC + 273.15$	$q_{lost} = -q_{gained}$
$q=mc\Delta T$	$q=n_{LR}\Delta H_{rxn}$	$q=m\Delta H$