CHEM 1104 TEST#3

NAME: **Date: June 6, 2018**
Student Number:

1. Using the enthalpy of formation data below calculate ΔH° for the following reaction:

$$3NO_2(g) + H_2O(l) \rightarrow 2HNO_3(aq) + NO(g) \qquad \Delta H^\circ =$$

Compound	ΔH_f°(kJ/mole)
$HNO_3(aq)$	-207.4
$H_2O(l)$	-285.8
$NO(g)$	90.29
$NO_2(g)$	33.10

2. Using Hess's law and the thermochemical data below determine ΔH for the reaction below.

$$CS_2(l) + 3O_2 \rightarrow CO_2(g) + 2SO_2(g) \qquad \Delta H = ?$$

Given:
1. $C(s) + O_2 \rightarrow CO_2(g)$ $\Delta H = -393.5$ kJ
2. $S(s) + O_2 \rightarrow SO_2(g)$ $\Delta H = -296.8$ kJ
3. $C(s) + 2S(s) \rightarrow CS_2(l)$ $\Delta H = +87.9$ kJ

3. A 0.922 g sample of naphthalene, $C_{10}H_8$, a major component in mothballs, is burned in a bomb calorimeter that has a heat capacity of 9.44 kJ/°C. The temperature rose from 15.73°C to 19.66°C. Calculate the heat of combustion of naphthalene and express your answer in the units kJ/mole.

Atomic Mass of C = 12.01 g/mole

Atomic Mass of H = 1.01 g/mole

$$-q_{rxn} = q_{cal}$$

$$q_{cal} = C_{cal}\Delta t$$

$$\Delta H = q_p$$

$$\Delta E = q_v$$

Answer Set for CHEM 1104 TEST#3

1. -138.0 kJ; 3 pt

2. -1075.0 kJ; 4 pt

3. -37.1 kJ, 2 pt; -5160 kJ/mole, 1 pt