Name_____ Period _____

Honors Chemistry
Thermodynamics Practice Test

Form P

Part I: Define the following twelve terms.

1. Temperature

2. Heat

3. calorie

4. Calorie

5. First law of Thermodynamics

6. Second law of Thermodynamics

7. Zeroth law of Thermodynamics

8. system

9. surroundings

10. enthalpy

11. entropy

12. open system

Part II: Numerical calculations.
1. Use Hess' Law to calculate the heat of reaction for:

$ClF(g) + F_2(g) \leftrightarrows ClF_3(l)$

From:

$2ClF(g) + O_2(g) \leftrightarrows Cl_2O(g) + OF_2(g)$ $\Delta H^o = 167.5$ kJ

$2F_2(g) + O_2(g) \leftrightarrows 2OF_2(g)$ $\Delta H^o = -43.5$ kJ

$2ClF_3(l) + 2O_2(g) \leftrightarrows Cl_2O(g) + 3OF_2(g)$ $\Delta H^o = 394.1$ kJ

2. Given the following data:

$Fe_2O_3(s) + 3CO(g) \leftrightarrows 2Fe(s) + 3CO_2(g)$ $\Delta H° = -28$ kJ
$3Fe_2O_3(s) + CO(g) \leftrightarrows 2Fe_3O_4(s) + CO_2(g)$ $\Delta H° = -59$ kJ
$Fe_3O_4(s) + CO(g) \leftrightarrows 3FeO(s) + CO_2(g)$ $\Delta H° = +38$ kJ

Calculate $\Delta H°$ for the reaction

$$FeO(s) + CO(g) \leftrightarrows Fe(s) + CO_2(g)$$

Heat Capacities for common materials:

Substance	Specific Heat	Substance	Specific Heat
H_2O (s)	2.06 J/g °C	Aluminum (s)	0.900 J/g °C
H_2O (g)	2.02 J/g °C	Benzene (l)	1.74 J/g °C
H_2O (l)	4.18 J/g °C	Ethanol (l)	2.42 J/g °C

Phase Change Data

Substance	Heats of Fusion	Heats of Vaporization	Boiling Points	Melting Points
H_2O	333.5 J/g	2258 J/g	373.2 K	273.2 K
Benzene	135.5 J/g	394 J/g	353.2 K	278.6 K
Ethanol	99.8 J/g	944 J/g	351.5 K	158.7 K
Acetone	98.5 J/g	500.9 J/g	329.4 K	179 K

5. You have a sample of H_2O with a mass of 200.0 g at a temperature of –50.0 °C. How many joules of heat energy are necessary to:

A) heat the ice to 0°C?

B) melt the ice?

C) heat the water from 0°C to 100°C?

D) boil the water?

E) heat the steam from 100°C to 110°C?