21) Consider the following reaction + 5 points

$2\ Cl\ (g) \rightarrow Cl_2\ (g)$ $\Delta H = 243.4$ KJ

Which has the higher enthalpy under the same conditions:

2 Cl or Cl_2

Cl_2 .

5

22. From the enthalpies of reaction 10 points

$H_2\ (g) + F_2\ (g) \rightarrow 2HF\ (g)$ $\Delta H = -\ 537$ kJ

$C(s) + 2\ F_2\ (g) \rightarrow CF_4\ (g)$ $\Delta H = -\ 680$ kJ

$2C\ (s) + 2H_2\ (g) \rightarrow C_2H_4(g)$ $\Delta H = +52.3$ kJ

Calculate the ΔH for the following reaction

$C_2H_4(g) + 6F_2 \rightarrow 2CF_4(g) + 4HF\ (g)$

5

−1

kJ

$2H_2 + 2F_2 \rightarrow 4HF$ -537×2

$2C + 4F_2 \rightarrow 2CF_4$ -680×2

$C_2H_4 \rightarrow 2C + 2H_2$ -52.3

$C_2H_4 + 6F_2 \rightarrow 4HF + 2CF_4$.

$\Delta H = -2486.3$ kJ

5

Blue

Blue

23. What wavelength of radiation has a photons of energy 2.87×10^{-18}. Joules.
(worth 5 points)

$E = h\nu$

$E = \frac{hc}{\lambda}$ $\quad \lambda = \frac{hc}{E}$ 2

$= \frac{6.626 \times 10^{-34} \cancel{J \cdot s} \times 3 \times 10^{8} \frac{m}{\cancel{s}}}{2.87 \times 10^{-18} \text{ Joules}}$ 2

$\lambda = 6.926 \times 10^{-8}$ meters.

$= 6.93 \times 10^{-8}$ meters

24. $2\ KClO_3\ (s) \rightarrow 2\ KCl\ (s) + 3\ O_2\ (g) \quad \Delta H = -89.4\ kJ$
(worth 5 points each)

a. Calculate ΔH for the formation of 0.855 mole of O2

O_2 $\quad 0.855 \text{ mole } O_2 \times \frac{-89.4 \text{ kJ}}{3 \text{ mole } O_2}$ 5

$= -25.479$ kJ.

b. ΔH for decomposition of 10.75 g of KCl.

$\frac{1 \text{ mole}}{74.55} \times 10.75 \text{ g KCl} \quad (39.10 + 35.45)$ kcl

$= .14419$ moles.

5 $\quad .14419 \times \frac{-89.4 \text{ kJ}}{\frac{\text{mole}}{2 \text{ KCl}}} = -6.4$ kJ

Pink

21 Consider the following reaction + 5 points

$2\ Cl\ (g) \rightarrow Cl_2\ (g)$ $\Delta H = 243.4$ KJ

Which has the higher enthalpy under the same conditions:

2 Cl or Cl_2

Cl_2

22 From the enthalpies of reaction 10 points

$H_2\ (g) + F_2\ (g) \rightarrow 2HF\ (g)$	$\Delta H = -\ 589$kJ
$C(s) + 2\ F_2\ (g) \rightarrow CF_4\ (g)$	$\Delta H = -\ 780$ kJ
$2C\ (s) + 2H_2\ (g) \rightarrow C_2H_4(g)$	$\Delta H = +55.3$ kJ

Calculate the ΔH for the following reaction

$$C_2H_4(g) + 6F_2 \rightarrow 2CF_4(g) + 4HF\ (g)$$

KJ

$2\ H_2 + 2\ F_2 \rightarrow 4\ HF \quad -589 \times 2$

$2\ C + 4\ F_2 \rightarrow 2\ CF_4 \quad -780 \times 2$

$C_2H_4 \rightarrow 2C + 2H_2 \quad -55.3$

$C_2H_4 + 6\ F_2 \rightarrow 2\ CF_4 + 4\ HF$

$\Delta H = -2793.3$ kJ

Pink

23. What wavelength of radiation has a photons of energy 5.87 x 10^{-18}. Joules.
(worth 5 points)

$$E = h\nu$$

$$E = \frac{hc}{\lambda}$$

$$\lambda = \frac{hc}{E}$$

$$= \frac{6.626 \times 10^{-34} \times J.S \times 3 \times 10^{8} \frac{m}{s}}{5.87 \times 10^{-18}}$$

$$= 3.386371 \times 10^{-8} = \lambda = 3.39 \times 10^{-8} m$$

24. $2\,KClO_3\ (s) \rightarrow 2\,KCl\ (s) + 3\,O_2\ (g)$ $\Delta H = -82.4$ kJ
(worth 5 points each)

a. Calculate ΔH for the formation of 0.755 mole of O2

$$0.755 \times \frac{-82.4\ kJ}{3\ mole\ O_2} = -20.73\ kJ$$

b. ΔH for decomposition of 17.15 g of KCl.

$$17.15\ g \times \frac{1\ mole}{74.55} = 0.2300\ moles.$$

$$.2300 \times \frac{-82.4}{2} = ~~-103 kJ~~ -9.47\ kJ$$

Answer Key
Testname: TEST 3

1) B
2) D
3) B
4) A
5) A
6) A
7) C
8) B
9) B
10) A
11) C
12) C
13) B
14) B
15) A
16) A
17) A
18) C
19) E
20) E

Blue

Answer Key
Testname: TEST 3 / Fall 2007 / CH115

1) A
2) B
3) A
4) D
5) E
6) B
7) E
8) C
9) B
10) E
11) B
12) B
13) C
14) A
15) E
16) C
17) C
18) E
19) B
20) C

Pink