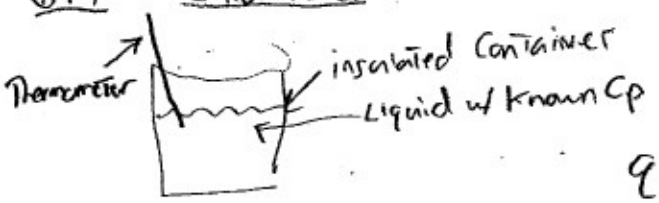
6.5

⇒ Gas moves faster & has higher energy

6.13 Specific heat -
amount of energy to heat 1g 1°C

6.14 Calorimeter -



$$q_{water} = \frac{\text{Mass} \cdot \left(4.184 \frac{J}{g \cdot C^\circ}\right) \cdot \Delta T}{\text{moles Reactant}}$$

Mass of water,
initial + Final Temp
moles of Reactants

6.27

6.45 +2940 KJ

6.47 $4(-113.2\ kJ) = \boxed{-4.528 \times 10^{2}\ kJ}$

6.50 $1g\ H_2 \cdot \frac{1\ mol\ H_2}{2g\ H_2} \cdot \frac{-484kJ}{2\ mol\ H_2} = \boxed{-121\ KJ}$

6.52 $26.7g \cdot \frac{1\ mol}{34.1g\ H_2S} \cdot \frac{-1037kJ}{2\ mol\ H_2S} = \boxed{-406\ kJ}$

6.54 $-293kJ \cdot \frac{1\ mol}{-1235kJ} \cdot \frac{46.0g}{1\ mol} = \boxed{10.9g}$

C_2H_6O
24 6 16 =

6.56 $q = m \times C_p \times \Delta T = 1.63 \times 10^3 g \left(\frac{0.449 J}{g \cdot C^\circ}\right) \cdot (21 - 178) = \boxed{-1.15 \times 10^5\ J}$

6.62 $3.51\,g \cdot \left(\frac{1\,mol}{78.1\,g}\right) = 4.49\times10^{-2}\,mol$

$\frac{12.05\,kJ}{°C} \cdot (37.18 - 25.00) = 1.47\times10^{2}\,kJ$

$\frac{1.47\times10^{2}\,kJ}{4.49\times10^{-2}\,mol} = 3.27\times10^{3}\,\frac{kJ}{mol}$

6.63 $N_2 + 2H_2 \longrightarrow N_2H_4$

$N_2 + 2H_2O \longrightarrow N_2H_4 + O_2 \quad +622.2\,kJ$

$2(H_2 + \frac{1}{2}O_2 \longrightarrow H_2O) \quad 2(-285.8)$

$N_2 + 2H_2 \longrightarrow N_2H_4 \quad \Delta H = 5.060\times10^{1}\,kJ$

6.64 $H_2 + O_2 \longrightarrow H_2O_2$

$H_2O + \frac{1}{2}O_2 \longrightarrow H_2O_2 \quad +98.0$

$\frac{1}{2}(2H_2 + O_2 \longrightarrow 2H_2O) \quad \frac{1}{2}(-571.6)$

$H_2 + O_2 \longrightarrow H_2O_2 \quad -187.5$

6.69 Skip

6.72 $CS_2 + 3O_2 \rightarrow CO_2 + 2SO_2$

$\Delta H = [\text{Products}] - [\text{Reactants}]$

$= [2(-296.8) + -393.5] - [117 - 3(0)]$

$\Delta H = -1.104\times10^{3}\,\frac{kJ}{mol}$

6.86

$q = m \cdot C_p \cdot \Delta T$

heat out of water = − heat into zinc

$q_{water} = -q_{zinc}$

$(50.0)(4.184)(96.68 - 100) = -[25.3 \cdot C_p \cdot (96.68 - 25.3)]$

$0.3830 \frac{J}{g^\circ} = C_p$

6.86 $24.5\,g \cdot \frac{1\,mol\,CaO}{[40.1+16.0]\,g\,CaO} \cdot \left(\frac{-65.2\,kJ}{1\,mol}\right) = -28.5\,kJ$

6.88 $\Delta H = \frac{kJ}{mol}$ $3.58\,g \cdot \frac{1\,mol}{60.0\,g} = 0.05967\,mol$

$C_2H_4O_2 = 24+4+32 = 60.0$

$\frac{52.0\,kJ}{.05967\,mol} = \frac{872\,kJ}{mol}$

6.116 $CS_2 + 3Cl_2 \rightarrow S_2Cl_2 + CCl_4$ $\Delta H = -232\,kJ$

10.0g 10.0g

$10.0\,g\,Cl_2 \cdot \frac{1\,mol}{(35.5\times2)} \cdot \frac{1\,CS_2}{3\,Cl_2} \cdot \frac{[12.0+2\times32.1]\,g}{mol\,CS_2} = 3.58\,g\,CS_2$ react w/ $10\,g\,Cl_2$

Cl_2 is LR

$10.0\,g\,Cl_2 \left(\frac{1\,mol}{71.0}\right) \times \frac{-232\,kJ}{3\,mol\,Cl_2} = -10.9\,kJ$