

1. (a) going from (g) to (l) would mean  $\Delta S < 0$

(b) The number of moles is greater in the reactants than products so  $\Delta S < 0$ .

(c) Temperature is increasing  $\Delta S > 0$ .

(d) The number of moles is increasing in products so  $\Delta S > 0$ .

2.  $T = 25^\circ\text{C} \rightarrow 298\text{ K}$

$$\Delta G = \Delta H - T\Delta S$$

$$\Delta H = 90.84 \text{ kJ/mol}$$

$$\Delta S = 108 \text{ J/mol K}$$

$$\Delta G = 90840 \text{ J} - (298 \text{ K})(108 \text{ J/K})$$

$$\Delta G = 58656 \text{ J}$$

no it is not spontaneous

3. When  $\Delta H > 0$  the reaction is endothermic

When  $\Delta H < 0$  the reaction is exothermic

4. 

	Cu	Solut.
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m	50	500000
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$T_i$	98	31.9
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$T_f$	50	50
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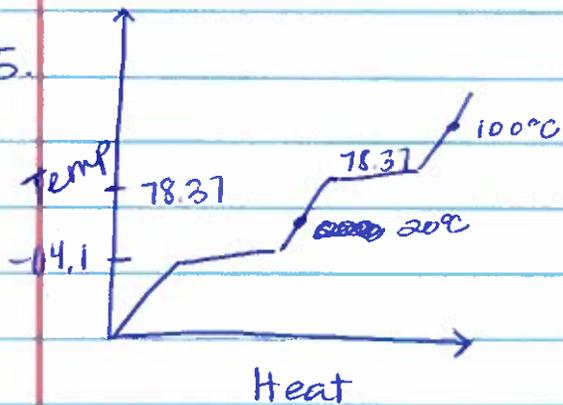
$$c = 0.0000203 \text{ cal/g}^\circ\text{C}$$

$\Delta T$	40	18.1
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$c$	0.092	? <del>0.0000203</del>
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$q$	784	<del>0050000</del> +184
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5.



$$Q_{\text{total}} = q_s + q_v + q_g$$

$$q_s = (20\text{g})(2.46)(58.37)$$

$$= 107.57\text{ J}$$

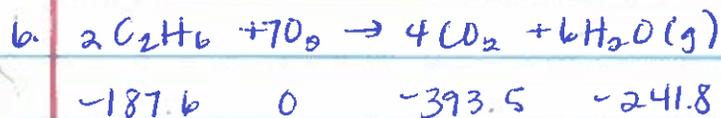
$$q_v = (20\text{g})(879\text{ J/g})$$

$$= 17580\text{ J}$$

$$q_g = (20\text{g})(2.46)(21.63)$$

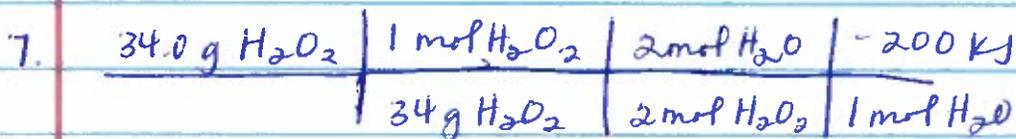
$$= 1064.2\text{ J}$$

$$Q_{\text{total}} = \boxed{18751.8\text{ J}}$$



$$\boxed{6(-241.8\text{ kJ/mol}) + 4\text{mol}(-393.5\text{ kJ/mol})} - \boxed{2\text{mol}(-187.6\text{ kJ/mol})}$$

$$\boxed{\Delta H = -2649.6\text{ kJ}}$$



$$\boxed{-200\text{ kJ}}$$

8.