

Chapter 5

(2) a) increase b) positive c) endothermic

(6) a) system temp. decreases, surrounding temp. increases
 q^- exothermic, q^+

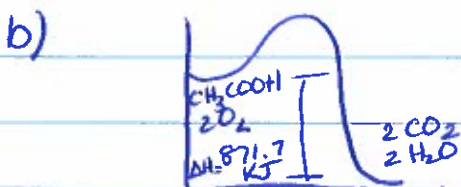
(7) water, has higher specific heat

(25) a) $+105 - 29 = 76 \text{ kJ} = \Delta E$
 endothermic

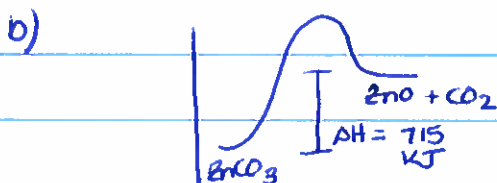
b) $1.5 \times 1000 - 657 = 843 \text{ J} = \Delta E$
 endothermic

c) $-57.5 - 22.5 \text{ kJ} = -80 \text{ kJ} = \Delta E$
 exothermic

(37) a) $\text{CH}_3\text{COOH} + 2\text{O}_2 \rightarrow 2\text{H}_2\text{O} + 2\text{CO}_2 + 871.7 \text{ kJ}$
 $\Delta H = -871.7 \text{ kJ}$



(38) a) $\text{ZnCO}_3 + 715 \text{ kJ} \rightarrow \text{ZnO} + \text{CO}_2$
 or $\Delta H = 715 \text{ kJ}$



(39) 2 Cl

(40) a) $\text{CO}_2(\text{g})$

b) 2 mol H_2

c) 1 mol H_2 + 0.5 mol O_2

d) N_2 at 300°C

Chapter 5 continued...

(41) a) exothermic

$$b) \frac{2.4g}{24.31g \text{ Mg}} \left| \frac{1 \text{ mol Mg}}{2 \text{ mol Mg}} \right| \frac{2 \text{ mol MgO}}{2 \text{ mol MgO}} \left| \frac{-1204 \text{ KJ}}{2 \text{ mol MgO}} \right| = -59 \text{ KJ}$$

$$c) \frac{-96 \text{ KJ}}{-1204 \text{ KJ}} \left| \frac{2 \text{ mol MgO}}{1 \text{ mol MgO}} \right| \frac{40.31g \text{ MgO}}{1 \text{ mol MgO}} = 6.43g \text{ MgO}$$

$$d) \frac{7.50g \text{ MgO}}{40.31g \text{ MgO}} \left| \frac{1 \text{ mol MgO}}{2 \text{ mol MgO}} \right| \frac{+1204 \text{ KJ}}{2 \text{ mol MgO}} = +112 \text{ KJ}$$

oprxn, opp sign

(42) a) absorbed

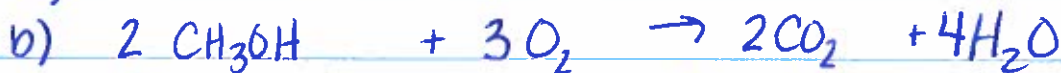
$$b) \frac{45.0g \text{ CH}_3\text{OH}}{32.042g \text{ CH}_3\text{OH}} \left| \frac{1 \text{ mol CH}_3\text{OH}}{1 \text{ mol CH}_3\text{OH}} \right| \frac{90.7 \text{ KJ}}{1 \text{ mol CH}_3\text{OH}} = 127. \text{ KJ}$$

$$c) \frac{25.8 \text{ KJ}}{90.7 \text{ KJ}} \left| \frac{2 \text{ mol H}_2}{1 \text{ mol H}_2} \right| \frac{2.016g}{1 \text{ mol H}_2} = 1.15g \text{ H}_2$$

$$\Delta H_{\text{reverse}} = -25.8 \text{ KJ}$$

$$d) \frac{50.9g \text{ CO}}{28.01g \text{ CO}} \left| \frac{1 \text{ mol CO}}{1 \text{ mol CO}} \right| \frac{-90.7 \text{ KJ}}{1 \text{ mol CO}} = -165 \text{ KJ}$$

(45) a) + 726.5 KJ



c) forward; exothermic is favored $\Delta H = -1453 \text{ KJ}$

d) increase

L \rightarrow g is vaporization = endothermic

- 726.5 + positive = less of a neg. #
therefore $\uparrow \Delta H$

Chapter 5 continued...

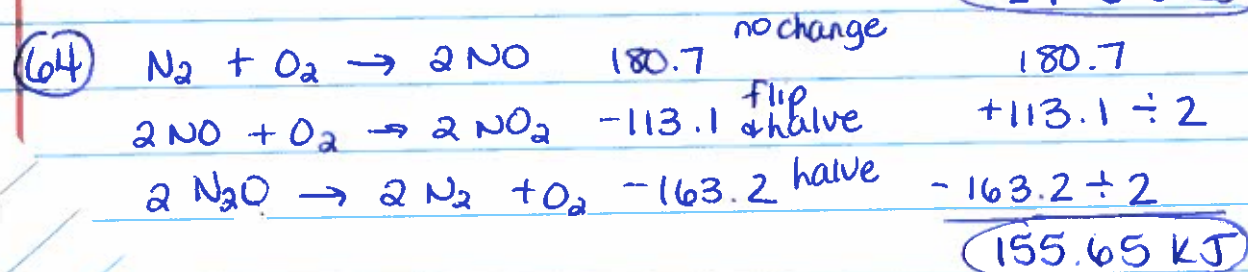
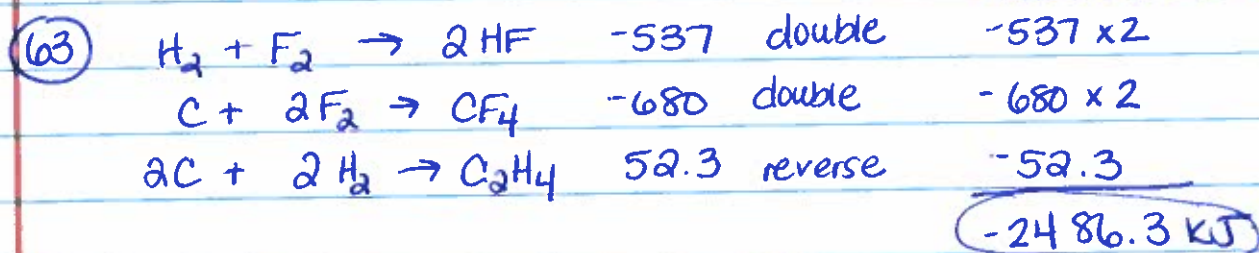
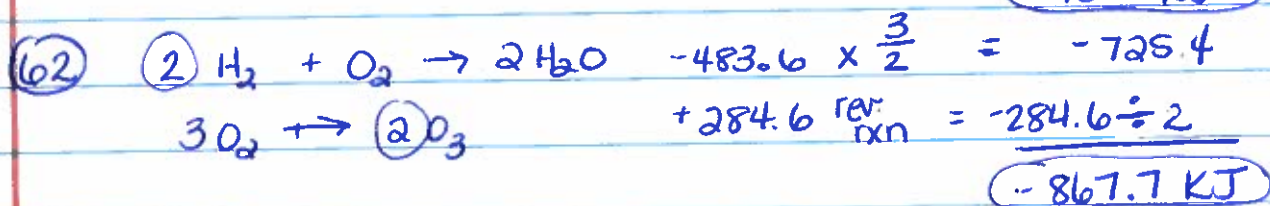
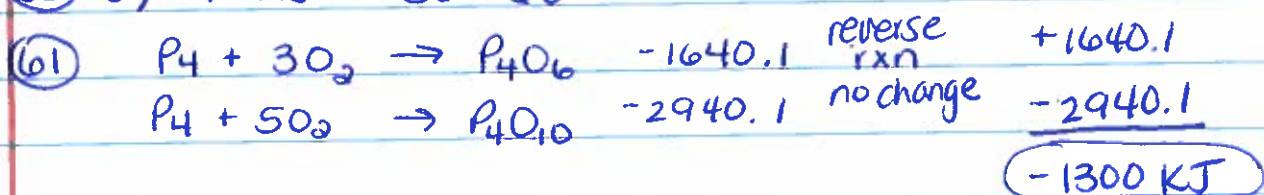
- (48) a) object A - raised the temp more
 b) sp heat $A > B$

- (50) a) Hg, lowest sp. heat

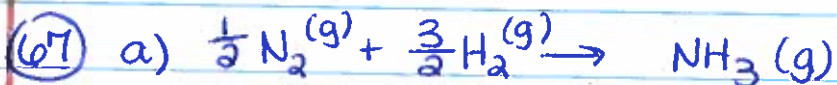
b) $q = mc\Delta T$
 $= 50 \cdot 0.14 \cdot 10$
 $= 70 \text{ J}$

(51) $q = (1.05 \times 1000) \cdot 0.45 \cdot (88.5 - 25)$
 $q = 30,003 \text{ J or } 3.00 \times 10^4 \text{ J}$

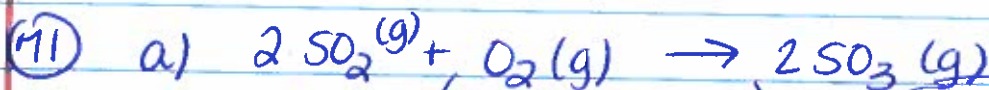
(60) a) $90 \text{ kJ} = 30 + 60$



Chapter 5 continued...



$$\Delta H = \text{prod} - \text{react} = -46.19 - (0 + 0) = -46.19 \text{ kJ}$$



$$2(-395.2) - (2(-296.9) + 0) = -196.6 \text{ kJ}$$



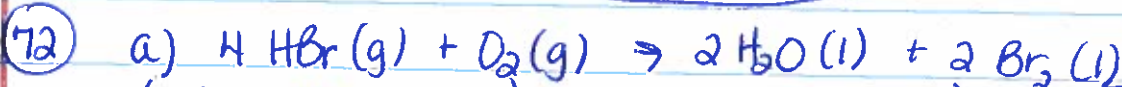
$$(-601.8 + -285.83) - (-924.7) = 37.07 \text{ kJ}$$



$$(0 + 4(-241.82)) - (9.66 + 4(0)) = -976.94 \text{ kJ}$$



$$(-910.9 + 4(-92.3)) - (-640.1 + 2(-285.83)) = -68.34 \text{ kJ}$$



$$(2(-285.83) + 2(0)) - (4(-36.23) + 0) = -426.74 \text{ kJ}$$