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Answers

a)

$$\begin{array}{ll} (2XK_4) & N_{2(g)} + 2O_{2(g)} \ \square \ 2NO_{2(g)} \\ (2XK_7) & 2NO_{2(g)} - \square \ 2NO_{(g)} + O_{2(g)} \\ \text{sum:} & N_{2(g)} + O_{2(g)} \ \square \ 2NO_{(g)} \\ \end{array} \quad \begin{array}{ll} \Delta H = 68 \ kJ \\ \Delta H = 112 \ kJ \\ \Delta H = 180 \ kJ \\ \end{array}$$

b)

$$\begin{array}{lll} (4XK_1) & 4C_{(s)} + 4O_{2(g)} - \square \ 4CO_{2(g)} \\ (5/2XK_6) & 5H_{2(g)} + \frac{5}{2}O_{2(g)} \ \square \ 5H_2O_{(g)} \\ (-1XK_3) & 4CO_{2(g)} - + \frac{5}{2}H_2O_{(g)} - \square \ C_4H_{10(g)} + \frac{13}{2}O_{2(g)} \\ \text{sum:} & 4C_{(s)} + 5H_{2(g)} \ \square \ C_4H_{10(g)} \\ \end{array} \qquad \begin{array}{ll} \Delta H = -1574 \ kJ \\ \Delta H = -1209 \ kJ \\ \Delta H = 2657 \ kJ \\ \Delta H = -126 \ kJ \\ \end{array}$$

c) Note: must use the equation that has liquid water (K_5) , not gaseous water $(K_6)!!$

$$\begin{array}{lll} (6XK_1) & 6C_{(s)} + 6O_{2(g)} \ \Box \ 6CO_{2(g)} \\ (-8XK_5) & 8H_{2(g)} + 4O_{2(g)} - \Box \ 8H_2O_{(l)} \\ (-2XK_2) & 6CO_{2(g)} + 8H_2O_{(l)} \ \Box \ 2C_3H_7OH_{(l)} + 9O_{2(g)} \\ \text{sum:} & 6C_{(s)} + O_{2(g)} + 8H_{2(g)} \ \Box \ 2C_3H_7OH_{(l)} \\ \end{array} \qquad \Delta H = -2361 \ kJ$$