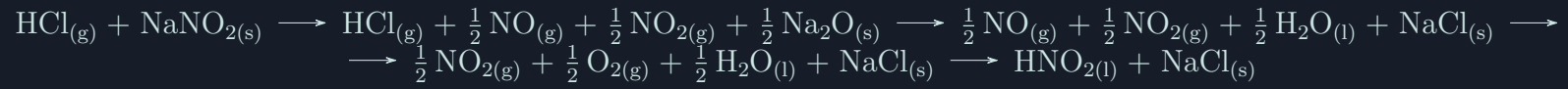


Questão 1 $\Delta\hat{H} \cong -78.50 \text{ kJ mol}^{-1}$



$$= (-0.5 * (-427) - 0.5 * (507) + 0.5 * (-43) - 0.5 * (34)) \text{ kJ mol}^{-1} \cong -79 \text{ kJ mol}^{-1}$$

Questão 2 $\hat{Q} \cong 1.93 \text{ MJ s}^{-1}$

$$\begin{aligned} &= \dot{M}_i \left([\text{T}]_i \Delta\hat{H}_{(\text{T}_1, (25 \rightarrow 70)^\circ\text{C})} + [\text{B}]_i \Delta\hat{H}_{(\text{B}_1, (25 \rightarrow 70)^\circ\text{C})} \right) + \dot{M}_{o1} \left([\text{T}]_{o1} \left(\Delta\hat{H}_{(\text{T}_1, (70 \rightarrow 110.6)^\circ\text{C})} + \Delta\hat{H}_{(\text{T}_1 \rightarrow \text{T}_g, 110.6^\circ\text{C})} + \Delta\hat{H}_{(\text{T}_g, (110.6 \rightarrow 70)^\circ\text{C})} \right) + \right. \\ &+ [\text{B}]_{o1} \left(\Delta\hat{H}_{(\text{B}_1, (70 \rightarrow 80.1)^\circ\text{C})} + \Delta\hat{H}_{(\text{B}_1 \rightarrow \text{B}_g, 80.1^\circ\text{C})} + \Delta\hat{H}_{(\text{B}_g, (80.1 \rightarrow 70)^\circ\text{C})} \right) \left. \right) = \left(100 \left(0.5 (148.8 \Delta t) \Big|_{298}^{343} + 0.5 (62.55 \Delta t) \Big|_{298}^{343} \right) + \right. \\ &+ 42.86 \left(35 \% \left((148.8 \Delta t) \Big|_{343}^{383.6} + 37.47 \text{ k} - (94.18 \Delta t) \Big|_{343}^{383.6} \right) + 65 \% \left((62.55 \Delta t) \Big|_{343}^{353.1} + 30.77 \text{ k} - (74.06 \Delta t) \Big|_{343}^{353.1} \right) \left. \right) \text{ J s}^{-1} \cong \\ &\cong 1.93 \text{ MJ s}^{-1} \end{aligned}$$

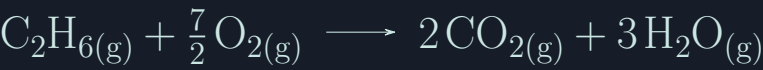
(i) $\dot{M}_{o1} \cong 42.86 \text{ mol s}^{-1}$

$$\begin{aligned} &= \dot{M}_i - \dot{M}_{o2} = [\text{T}]_{o1}^{-1} \left([\text{T}]_i \dot{M}_i - [\text{T}]_{o2} \dot{M}_{o2} \right) \implies \\ &\implies \dot{M}_{o1} = \dot{M}_i \left(1 - \frac{[\text{T}]_{o1} - [\text{T}]_i}{[\text{T}]_{o1} - [\text{T}]_{o2}} \right) = \\ &= \left(100 \left(1 - \frac{0.3 - 0.5}{0.3 - (1 - 0.35)} \right) \right) \text{ mol s}^{-1} \cong 42.86 \text{ mol s}^{-1} \end{aligned}$$

Questão 3

- 1 = 1i1
 - 2 = 1i2 = 2o1
- 3 = 1o = 2i1
 - 4 = 2o2
- 5 = 2i2

%mol/mol	1i1	1i2	2o1	1o	2i1	2o2	2i2
C ₂ H ₆	100		-		-	-	-
O ₂	-	100		28		28	100
CO ₂	-	-		32		32	-
H ₂ O	-	-		48		48	-
Total	100	525		625		625	525
Temp (°C)	30			350		150	25



(i) $\widehat{\text{M}}_{1i2} \cong 525 \text{ \%mol/mol}$

$$\begin{aligned} &= [\text{O}_2]_{1i2}^{-1} \left([\text{C}_2\text{H}_6]_{1i1} \widehat{\text{M}}_{1i1} (7/2) * 1.5 \right) = \\ &= (100 \text{ \%})^{-1} (100 \text{ \%} * 100 \text{ \%}(7/2) * 1.5) \text{ mol/mol} \cong 525 \text{ \%} \frac{\text{mol}}{\text{mol}} \end{aligned}$$

(ii) $\widehat{\text{M}}_{2i2} \cong 525 \text{ \%mol/mol}$

$$= \widehat{\text{M}}_{2o1} \cong 525 \text{ \%mol/mol}$$

(iii) $\widehat{\text{M}}_{1o} \cong 625 \text{ \%mol/mol}$

$$= \widehat{\text{M}}_{1i1} + \widehat{\text{M}}_{1i2} \cong (100 + 525) \text{ \%mol/mol} \cong 625 \text{ \%mol/mol}$$

(iv) $\widehat{\text{M}}_{2o2} \cong 625 \text{ \%mol/mol}$

$$= \widehat{\text{M}}_{2i1} \cong 625 \text{ \%mol/mol}$$

Q3 - a) t_{1i2}

$$\begin{aligned} &= t_{1i2} + \left(\widehat{\text{M}}_{2i2} [\text{O}_2]_{2i2} C_{(p,\text{O}_2)} \right)^{-1} \left(\widehat{\text{H}}_{(2i1,\text{O}_2,(350 \rightarrow 150)^\circ\text{C})} + \widehat{\text{H}}_{(2i1,\text{CO}_2,(350 \rightarrow 150)^\circ\text{C})} + \widehat{\text{H}}_{(i1,\text{H}_2\text{O},(350 \rightarrow 150)^\circ\text{C})} \right) = \\ &= \left(298 + (525 \text{ \%} * 100 \text{ \%} * 30.5)^{-1} \left(-625 \text{ \%} (28 \text{ \%} * 30.5 + 32 \text{ \%} * 42.2 + 48 \text{ \%} * 40.6) \Delta t \Big|_{423}^{623} \right) \right) \text{ K} \cong \\ &\cong \end{aligned}$$

