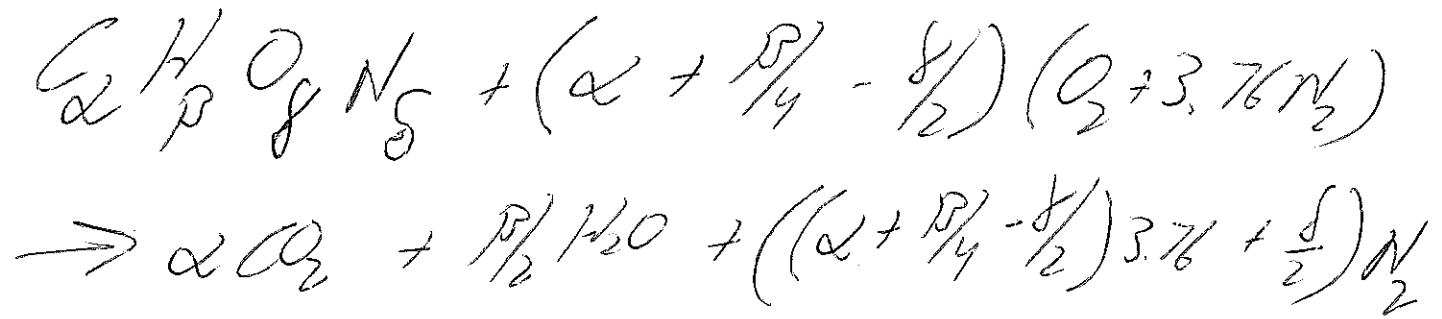


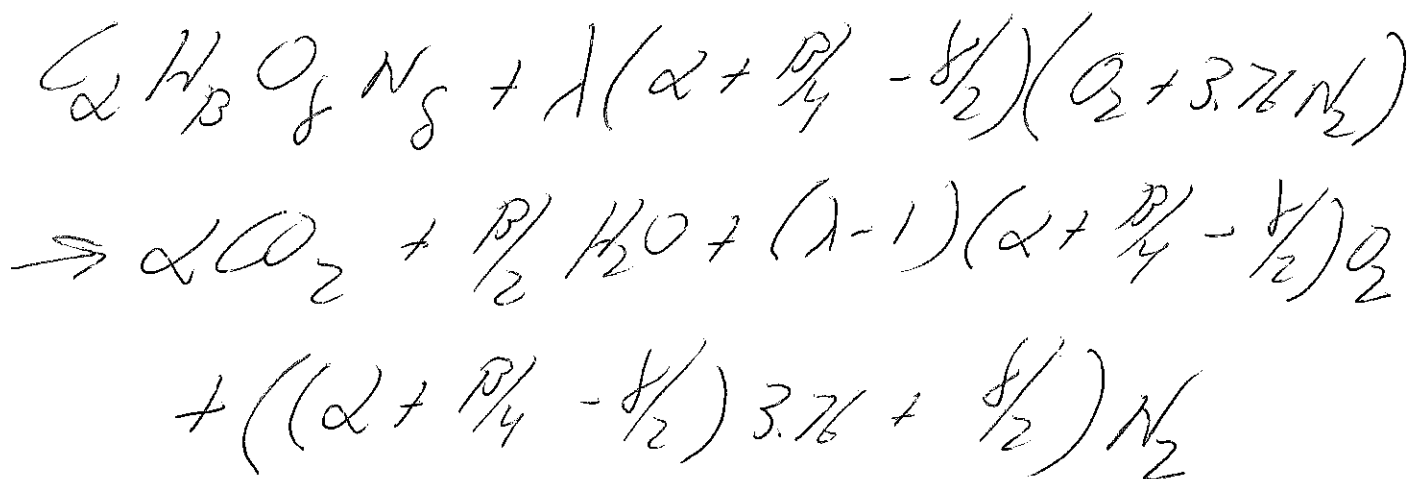
STOICHIOMETRIC COMBUSTION



$$\phi = \frac{(F/A)_{\text{REACT}}}{(F/R)_{\text{STOICHIOMETRIC}}} \quad \phi < 1 \text{ LEAN} \\ \phi > 1 \text{ RICH}$$

$$\lambda = \frac{(R/f)_{\text{REACT}}}{(R/f)_{\text{STOICHIOMETRIC}}} = \frac{1}{\phi}$$

GENERAL COMBUSTION ($\phi \leq 1$)



EXHAUST GAS ANALYSIS

DRY EXHAUST \rightarrow H_2O REMOVED

$$CO_2 \text{ FRACTION} = \frac{\alpha}{\text{TOTAL DRY MOLES}}$$

$$O_2 \text{ FRACTION} = \frac{(\lambda - 1) \left(\alpha + \frac{P}{4} - \frac{\delta}{2} \right)}{\text{TOTAL DRY MOLES}}$$

$$N_2 \text{ FRACTION} = \frac{\frac{\delta}{2} + 3.76 \lambda \left(\alpha + \frac{P}{4} - \frac{\delta}{2} \right)}{\text{TOTAL DRY MOLES}}$$

$$\begin{aligned} \text{TOTAL DRY MOLES} &= \alpha + (\lambda - 1) \left(\alpha + \frac{P}{4} - \frac{\delta}{2} \right) \\ &\quad + \left(3.76 \lambda \left(\alpha + \frac{P}{4} - \frac{\delta}{2} \right) + \frac{\delta}{2} \right) \end{aligned}$$