

ap00 - q6



(a)
$$\Delta H_{\text{rxn}}^{\circ} = \sum \Delta H_f^{\circ}(\text{Prod}) - \sum \Delta H_f^{\circ}(\text{React})$$
$$= [1(0) + 1(33)] - [1(143) + 1(90)]$$
$$= 33 - 233 = -200 \frac{\text{kJ}}{\text{mol}}$$

- (b) - ΔS° should be small or zero.
- # of moles of products (gases) is equal to reactants.

- (c) $\Delta G = \Delta H - T\Delta S$
- Should be (-) because ΔS° is near zero thus that term becomes negligible.

(d) $\frac{\# 2}{\# 1} = \frac{0.002}{0.001} = \frac{2x}{x} \quad 2^y = 2 \quad \therefore y = 1 \quad [\text{NO}]$

$$\frac{\# 4}{\# 2} = \frac{0.002}{0.001} = \frac{4x}{2x} \quad 2^x = 2 \quad \therefore x = 1 \quad [\text{O}_3]$$

Thus
$$\text{rate} = k[\text{O}_3]^1[\text{NO}]^1$$

- (e) Step 1 must be the rate determining step as this elementary step is the only one that agrees with the rate law.