

# CHEM-C1230 Principles of Physical Chemistry 2021

Some questions in the exercises of chapters 4 + 5

# Chapter 4

- **Question 1**

- For the overall reaction:

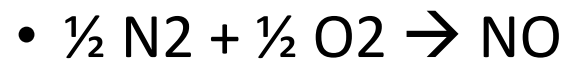


$$\Delta H_A^\circ = 66.4 \text{ kJ}$$

$$\Delta H_B^\circ = -180.4 \text{ kJ}$$

- $\Delta H = \Delta H_A^\circ + \Delta H_B^\circ$

- **Question 5.**



- $\Delta H_f^\circ(\text{NO}, g) = \Delta H_f^\circ(\text{NO}, g, T = 298.15\text{K}) + \Delta C_p \Delta T$

# Chapter 5

- **Thermo - Problem 5.32**

- Part A

- T = 298 K: (n and m are coefficients)

$$\Delta S^0 = \sum_n nS^0(\text{products}) - \sum_m mS^0(\text{reactants})$$

- At T = 359 K:

- Take  $S_m^0$  from part A.

$$S_m(T) = S_m^0 + \int_{298.15}^{T_f} \frac{\Delta C_{P,m}(T')dT'}{T'}$$

# Chapter 5

- **Thermo - Problem 5.32**
- Part B
- T = 298 K:

$$\Delta H_R^o = H_{prod}^o - H_{react}^o$$

- At T = 359 K:
- Take  $H_R^o$  from part A.

$$\Delta H_R^o(T) = \Delta H_R^o(T = 298.15K) + \int_{T_1}^T C_P(T') dT'$$

# Chapter 5

- **Thermo - Problem 5.32**
- Part C.

$$\Delta S_{\text{surroundings}} = \frac{-dq}{T} = \frac{-\Delta H^{\circ}_{\text{reaction}}}{T}$$

- Part D.

$$\Delta S_{\text{universe}} = \Delta S_{\text{reaction}} + \Delta S_{\text{surroundings}}$$