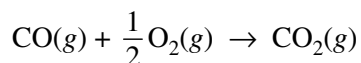


2006 AP[®] CHEMISTRY FREE-RESPONSE QUESTIONS

Answer EITHER Question 2 below OR Question 3 printed on page 8. Only one of these two questions will be graded. If you start both questions, be sure to cross out the question you do not want graded. The Section II score weighting for the question you choose is 20 percent.



2. The combustion of carbon monoxide is represented by the equation above.

- (a) Determine the value of the standard enthalpy change, $\Delta H_{\text{rxn}}^{\circ}$, for the combustion of $\text{CO}(g)$ at 298 K using the following information.



- (b) Determine the value of the standard entropy change, $\Delta S_{\text{rxn}}^{\circ}$, for the combustion of $\text{CO}(g)$ at 298 K using the information in the following table.

Substance	S_{298}° (J mol ⁻¹ K ⁻¹)
CO(g)	197.7
CO ₂ (g)	213.7
O ₂ (g)	205.1

- (c) Determine the standard free energy change, $\Delta G_{\text{rxn}}^{\circ}$, for the reaction at 298 K. Include units with your answer.
- (d) Is the reaction spontaneous under standard conditions at 298 K? Justify your answer.
- (e) Calculate the value of the equilibrium constant, K_{eq} , for the reaction at 298 K.