Equilibrium Postlab

Please do not give short (one or two word answers) to the questions.

ALL Answers must be written by hand directly into your lab notebooks.

1. Predict the effect of the following changes on the reaction in which SO₃ decomposes to form SO₂ and O₂.

   \[ 2 \text{SO}_3 (g) \leftrightarrow 2 \text{SO}_2 (g) + \text{O}_2 (g) \quad \Delta H^0 = 197.78 \text{ kJ} \]

   a. Increasing the temperature of the reaction
   b. Increasing the pressure of the reaction
   c. Adding more oxygen gas when the reaction is at equilibrium
   d. Adding O₃ to the reaction at equilibrium (assume O₃ does not react with anything present)

2. A person exposed to high levels of carbon monoxide is in trouble due to binding of CO molecules to hemoglobin (Hb). Oxygen doesn’t bind as strongly to hemoglobin as carbon monoxide. Use the following equations to illustrate why hyperbaric (high pressure) O₂ is used as the definitive treatment for CO poisoning and express this concept with a chemical equation and equilibrium expression. Qualitatively explain your reasoning.

   \[ \text{Hb} (\text{aq}) + 4 \text{O}_2 (g) \leftrightarrow \text{Hb(O}_2)_4 (\text{aq}) \]

   \[ \text{Hb} (\text{aq}) + 4 \text{CO} (g) \leftrightarrow \text{Hb(CO)}_4 (\text{aq}) \]