Quiz 7 Revision

Equilibrium

Consider the following reaction

$$CO(g) + Cl_2(g) \leftrightharpoons COCl_2(g) \quad \Delta H = \text{-ve}$$
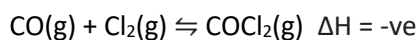
In a 2.00 litre reaction vessel a mixture of 2.00 mol of CO and 1.00 mol of Cl_2 gases is placed and allowed to reach equilibrium. When equilibrium was finally reached, at 200 °C, it was found that the mixture contained 0.600 mol of $COCl_2$.

a. Give the expression for Qc

b. Calculate the equilibrium constant for this reaction at 200 °C. Give your answer to the right number of significant figures and the correct unit.

c. Complete the table below.

Stress on the system whilst at equilibrium	Kc	Qc	Reaction response No response
Inject more $COCl_2$ into the reaction vessel at constant temperature			
Remove Cl_2 from the reaction vessel at constant temperature			
Double the volume of the reaction vessel at constant temperature			
Increase the temperature of the reaction vessel			
Addition of a catalyst at constant temperature			

d. The same reaction reached an equilibrium position at another unknown temperature. It concentration time graph is shown below. For each stress draw the response of the system. After each stress equilibrium is achieved before the next stress.

T_1 = CO gas is injected.
T_2 = $COCl_2$ is removed
T_3 = Volume is doubled
T_4 = Temperature decreases
T_5 = a catalyst is added
T_6 = pressure is doubled by the addition of helium gas