NAME:
Date: July 25, 2016
Student Number:

1. Phosgene, $\mathrm{COCl}_{2}$, a poisonous gas decomposes according to the equation:

$$
\mathrm{COCl}_{2}(\mathrm{~g}) \leftrightharpoons \mathrm{CO}(\mathrm{~g})+\mathrm{Cl}_{2}(\mathrm{~g}) \quad \mathrm{K}_{\mathrm{p}}=8.0 \text { at } 900^{\circ} \mathrm{C}
$$

a) Does this equilibrium favor the formation of the products or reactants. Explain.
b) If a sealed container at $900^{\circ} \mathrm{C}$ contains phosgene, $\mathrm{COCl}_{2}$, at a partial pressure of 1.5 atm and $\mathrm{CO}(\mathrm{g})$ and $\mathrm{Cl}_{2}(\mathrm{~g})$ at a partial pressure of 5.5 atm each, determine if the system is at equilibrium. If the system is not at equilibrium determine at which direction the equilibrium must shift to obtain equilibrium.
2. For the following reaction at equilibrium, state four different changes below that would cause the equilibrium to shift to the right(i.e, decrease the concentration of NOBr ).

$$
2 \mathrm{NOBr}(\mathrm{~g}) \leftrightharpoons 2 \mathrm{NO}(\mathrm{~g})+\mathrm{Br}_{2}(\mathrm{~g}) \quad \Delta \mathrm{H}^{\circ}=+30 \mathrm{~kJ}
$$

## Answer Set for CHEM 1105 TEST\#5

1.a) Since $K_{p}>1$ the equilibrium favors the products or the right.
b) $\mathrm{Q}=20 ., \mathrm{Q}>\mathrm{K}_{\mathrm{p}}$ thus the system is not at equilibrium and must shift to the left or reactants to achieve equilibrium.
2. Decrease the concentration of $\mathrm{NO}(\mathrm{g})$, decrease the concentration of $\mathrm{Br}_{2}(\mathrm{~g})$, increase the concentration of NOBr , increase the pressure or decrease the volume, and raise the temperature.

