**AP Chemistry Unit 8 Equilibrium Problem Sets**.

**Problem Set 1 – Equilibrium Concepts and Keq**

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| **1** | **2** |
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| **9** | **10** |
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| **11** | **12** |
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**Problem Set 2 – Equilibrium Constant Calculations**

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**Problem Set 3 – Applications of K: Direction (Q) and Extent of Reaction (ICE)**

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| At a particular temperature, a 2.00-L flask at equilibrium contains 2.80 x 10-4 moles of N2, 2.50 x 10-5 moles of O2, and 2.00 x 10-2 moles of N2O based on:   **N2 (g) + O2 (g) ←→ 2 NO (g).**In a different trial of the same reaction,    [N2] = 2.00 x 10-4M, [N2O] = 0.200 M, and [O2 ] = 0.00245 M, does this represent a system at equilibrium? If not, what directional shift must take place to establish equilibrium? |  |
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| **15** | **16** |
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**Problem Set 4 More ICE and Le Chatelier’s Principle**

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| **1** | **2** |
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| **3** | **4** |
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| **5** | **6** |
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| **7** | **8** |
| Phosgene, COCl2, is prepared from CO and Cl2 according to the following equation: CO + Cl2---> COCl2. Kc at 395 °C is 1.23 x 103. If 2.00 mol of CO and 3.50 mol of Cl2 are added to a 5.00 liter reaction vessel at 395 °C, what would the equilibrium concentrations be for all species? |  |
| **9** | **10** |
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| **11** | **12** |
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| **13** | **14** |
| Methanol (CH3OH) can be made by the reaction of CO with H2:   **CO (g) + 2 H2 (g)** ⬄ **CH3OH (g)**a)Use the following thermochemical data to calculate ∆H° for this reaction:

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| --- | --- |
| CO (g) | -110.5 kJ/mol |
| CH3OH (g) | -201.0 kJ/mol |

 b)To maximize the equilibrium yield of methanol, would you use a high or low temperature? Explain.c)To maximize the equilibrium yield of methanol, would you use a high or low pressure? Explain. |  |
| **15** | **16** |
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