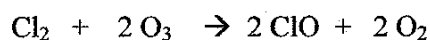


Name Key (print) Name _____ (sign)
 Please show all work for full credit & to get partial credit. (suggestion: A guess is better than no answer.)

1. For the following overall reaction (not reaction mechanism step, the overall reaction), Given the concentrations and rates, give the order of the reactant by circling the order for the reagent given. You should assume an irreversible reaction. (note: I made up these reactions to illustrate the point so the reactions as given may not go experimentally as written.) (3 pts each, 6 pts total)

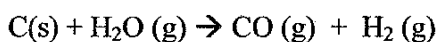


[Cl ₂]	[O ₃]	rate
2	2	4
4	2	4
2	4	8

double Cl₂ - rate no change
 double O₃ - rate doubled
 rate = k [Cl₂]⁰ [O₃]¹

order of the [Cl] is (zero) (one) (circle one)
 order of the [O₃] is (zero) (one) (circle one)

2. For the following reaction give the equation for the equilibrium constant (K) in concentrations of the reagents given. You should assume that the gases dissolve so that you can give K in concentrations of the units of molarity. (6 pts)



$$K = \frac{[\text{CO}][\text{H}_2]}{[\text{H}_2\text{O}]}$$

C is solid - leave out
 of K expression

3. For the reaction given, set up the ICE table for a reaction in which the reactant gases are mixed in a constant volume of an inert solvent with no products present initially: (1 pt each blank, 9 pts total)

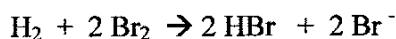


If the initial concentration of the CO (g) is 0.415 M, and the initial concentration of Cl₂ (g) is 0.543 M. If at equilibrium, the concentration of the CO Cl₂ is 0.098 M. Show the initial, change and equilibrium concentrations for all 3 reagents.

	[CO]	[Cl ₂]	[COCl ₂]
Initial	0.415	0.543	0
Change	-0.098	-0.098	+0.098
Equilibrium	0.317	0.445	0.098

Name Key (print) Name _____ (sign)
 Please show all work for full credit & to get partial credit. (suggestion: A guess is better than no answer.)

1. For the following overall reaction (not reaction mechanism step, the overall reaction), Given the concentrations and rates, give the order of the reactant by circling the order for the reagent given. You should assume an irreversible reaction. (note: I made up these reactions to illustrate the point so the reactions as given may not go experimentally as written.) (3 pts each, 6 pts total)

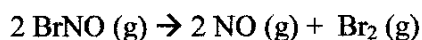


[H ₂]	[Br ₂]	rate
3	3	1
3	6	2
6	3	1

double Br₂ - rate doubles
 double H₂ - rate not affected
 rate = k [H₂]⁰ [Br₂]¹

order of the [H₂] is (zero) (one) (circle one)
 order of the [Br₂] is (zero) (one) (circle one)

2. For the following reaction give the equation for the equilibrium constant (K) in concentrations of the reagents given. You should assume that the gases dissolve so that you can give K in concentrations of the units of molarity. (6 pts)



$$K = \frac{[\text{NO}]^2 [\text{Br}_2]}{[\text{BrNO}]^2}$$

using $aA + bB \rightleftharpoons cC + dD$

$$K = \frac{[C]^c [D]^d}{[A]^a [B]^b}$$

3. For the reaction given, set up the ICE table for a reaction in which the reactant gases are mixed in a constant volume of an inert solvent with no products present initially: (1 pt each blank, 9 pts total)



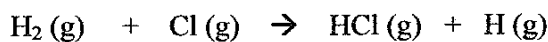
If the initial concentration of the N₂ (g) is 0.985 M, and the initial concentration of H₂ (g) is 0.996 M. If at equilibrium, the concentration of the NH₃ is 0.057 M. Show the initial, change and equilibrium concentrations for all 3 reagents.

	[N ₂]	[H ₂]	[NH ₃]
Initial	0.985	0.996	0
Change	- $\frac{0.057}{2}$	- $(\frac{0.057}{2}) \times 3$	+0.057
Equilibrium	0.957	0.911	0.057

for +0.057 NH₃ → ÷ 2 for N₂ →
 ÷ 2 × 3 for H₂

Name Key (print) Name _____ (sign)
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1. For the following overall reaction (not reaction mechanism step, the overall reaction), Given the concentrations and rates, give the order of the reactant by circling the order for the reagent given. You should assume an irreversible reaction. (note: I made up these reactions to illustrate the point so the reactions as given may not go experimentally as written.) (3 pts each, 6 pts total)

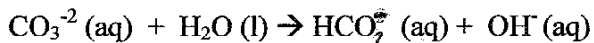


[H ₂]	[Cl]	rate
9	9	4
9	18	4
18	9	4

double [Cl] rate no change
double [H₂] rate no change
 $\text{rate} = k[\text{H}_2]^0[\text{Cl}]^0$

order of the [H₂] is (zero) (one) (circle one)
 order of the [Cl] is (zero) (one) (circle one)

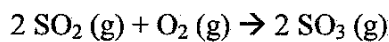
2. For the following reaction give the equation for the equilibrium constant (K) in concentrations of the reagents given. You should assume that the gases dissolve so that you can give K in concentrations of the units of molarity. (6 pts)



$$K = \frac{[\text{HCO}_3^-][\text{OH}^-]}{[\text{CO}_3^{2-}]}$$

H₂O is a liquid leave it out of equilibrium expression

3. For the reaction given, set up the ICE table for a reaction in which the reactant gases are mixed in a constant volume of an inert solvent with no products present initially: (1 pt each blank, 9 pts total)



If the initial concentration of the SO₂ (g) is 0.117 M, and the initial concentration of O₂ (g) is 0.223 M. If at equilibrium, the concentration of the SO₃ is 0.043 M. Show the initial, change and equilibrium concentrations for all 3 reagents.

	[SO ₂]	[O ₂]	[SO ₃]
Initial	0.117	0.223	0
Change	-0.043	-0.043/2	+0.043
Equilibrium	0.074	0.202	0.043

0.0215 ↑

Name Key (print) Name _____ (sign)
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1. For the following overall reaction (not reaction mechanism step, the overall reaction), Given the concentrations and rates, give the order of the reactant by circling the order for the reagent given. You should assume an irreversible reaction. (note: I made up these reactions to illustrate the point so the reactions as given may not go experimentally as written.) (3 pts each, 6 pts total)



[NH₃] [OCl⁻]

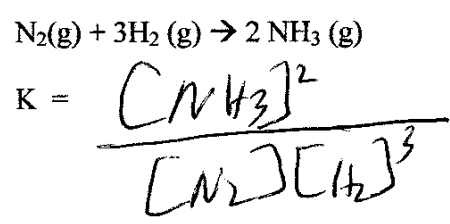
2 4
 4 4
 2 8

rate
 double [NH₃] double rate
 double OCl⁻; no effect rate

$$\text{rate} = k[\text{NH}_3][\text{OCl}^-]^0$$

order of the [NH₃] is (zero) (one) (circle one)
 order of the [OCl⁻] is (zero) (one) (circle one)

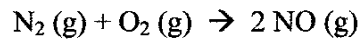
2. For the following reaction give the equation for the equilibrium constant (K) in concentrations of the reagents given. You should assume that the gases dissolve so that you can give K in concentrations of the units of molarity. (6 pts)



using $aA + bB \rightleftharpoons cC + dD$

$$K = \frac{[C]^c [D]^d}{[A]^a [B]^b}$$

3. For the reaction given, set up the ICE table for a reaction in which the reactant gases are mixed in a constant volume of an inert solvent with no products present initially: (1 pt each blank, 9 pts total)



If the initial concentration of the N₂ (g) is 0.789 M, and the initial concentration of O₂ (g) is 0.899 M. If at equilibrium, the concentration of the NO is 0.230 M. Show the initial, change and equilibrium concentrations for all 3 reagents.

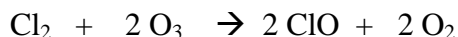
0.115 ←

	[N ₂]	[O ₂]	[NO]
Initial	0.789	0.899	0
Change	-0.230/2	-0.230/2	+0.230
Equilibrium	0.674	0.784	0.230

Name _____(print) Name _____(sign)

Please show all work for full credit & to get partial credit. (suggestion: A guess is better than no answer.)

1. For the following overall reaction (not reaction mechanism step, the overall reaction), Given the concentrations and rates, give the order of the reactant by circling the order for the reagent given. You should assume an irreversible reaction. (note: I made up these reactions to illustrate the point so the reactions as given may not go experimentally as written.) (3 pts each, 6 pts total)



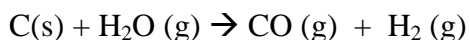
[Cl₂] [O₃] rate

2	2	4
4	2	4
2	4	8

order of the [Cl] is (zero) (one) (circle one)

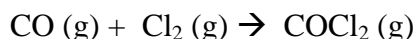
order of the [O₃] is (zero)(one) (circle one)

2. For the following reaction give the equation for the equilibrium constant (K) in concentrations of the reagents given. You should assume that the gases dissolve so that you can give K in concentrations of the units of molarity. (6 pts)



K =

3. For the reaction given, set up the ICE table for a reaction in which the reactant gases are mixed in a constant volume of an inert solvent with no products present initially: (1 pt each blank, 9 pts total)



If the initial concentration of the CO (g) is 0.415 M, and the intial concentration of Cl₂ (g) is 0.543 M. If at equilibrium, the concentration of the CO Cl₂ is 0.098 M. Show the initial, change and equilibrium concentrations for all 3 reagents .

	[CO]	[Cl ₂]	[COCl ₂]
Initial			
Change			
Equilibrium			

Name _____(print) Name _____(sign)

Please show all work for full credit & to get partial credit. (suggestion: A guess is better than no answer.)

4. For the following overall reaction (not reaction mechanism step, the overall reaction), Given the concentrations and rates, give the order of the reactant by circling the order for the reagent given. You should assume an irreversible reaction. (note: I made up these reactions to illustrate the point so the reactions as given may not go experimentally as written.) (3 pts each, 6 pts total)



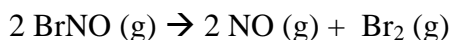
[H₂] [Br₂] rate

3	3	1
3	6	2
6	3	1

order of the [H₂] is (zero) (one) (circle one)

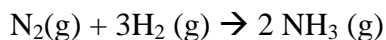
order of the [Br₂] is (zero)(one) (circle one)

5. For the following reaction give the equation for the equilibrium constant (K) in concentrations of the reagents given. You should assume that the gases dissolve so that you can give K in concentrations of the units of molarity. (6 pts)



K =

6. For the reaction given, set up the ICE table for a reaction in which the reactant gases are mixed in a constant volume of an inert solvent with no products present initially: (1 pt each blank, 9 pts total)



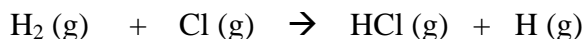
If the initial concentration of the N₂ (g) is 0.985 M, and the initial concentration of H₂ (g) is 0.996 M. If at equilibrium, the concentration of the NH₃ is 0.057 M. Show the initial, change and equilibrium concentrations for all 3 reagents .

	[N ₂]	[H ₂]	[NH ₃]
Initial			
Change			
Equilibrium			

Name _____(print) Name _____(sign)

Please show all work for full credit & to get partial credit. (suggestion: A guess is better than no answer.)

7. For the following overall reaction (not reaction mechanism step, the overall reaction), Given the concentrations and rates, give the order of the reactant by circling the order for the reagent given. You should assume an irreversible reaction. (note: I made up these reactions to illustrate the point so the reactions as given may not go experimentally as written.) (3 pts each, 6 pts total)



[H₂] [Cl] rate

9 9 4

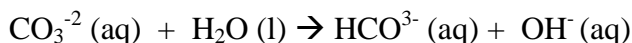
9 18 4

18 9 4

order of the [H₂] is (zero) (one) (circle one)

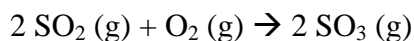
order of the [Cl] is (zero)(one) (circle one)

8. For the following reaction give the equation for the equilibrium constant (K) in concentrations of the reagents given. You should assume that the gases dissolve so that you can give K in concentrations of the units of molarity. (6 pts)



K =

9. For the reaction given, set up the ICE table for a reaction in which the reactant gases are mixed in a constant volume of an inert solvent with no products present initially: (1 pt each blank, 9 pts total)



If the initial concentration of the SO₂(g) is 0.117 M, and the initial concentration of O₂(g) is 0.223 M. If at equilibrium, the concentration of the SO₃ is 0.043 M. Show the initial, change and equilibrium concentrations for all 3 reagents .

	[SO ₂]	[O ₂]	[SO ₃]
Initial			
Change			
Equilibrium			

Name _____(print) Name _____(sign)

Please show all work for full credit & to get partial credit. (suggestion: A guess is better than no answer.)

10. For the following overall reaction (not reaction mechanism step, the overall reaction), Given the concentrations and rates, give the order of the reactant by circling the order for the reagent given. You should assume an irreversible reaction. (note: I made up these reactions to illustrate the point so the reactions as given may not go experimentally as written.) (3 pts each, 6 pts total)



[NH₃] [OCI⁻] rate

2 4 3

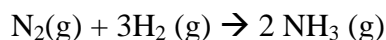
4 4 6

2 8 3

order of the [NH₃] is (zero) (one) (circle one)

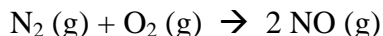
order of the [OCI⁻] is (zero)(one) (circle one)

11. For the following reaction give the equation for the equilibrium constant (K) in concentrations of the reagents given. You should assume that the gases dissolve so that you can give K in concentrations of the units of molarity. (6 pts)



K =

12. For the reaction given, set up the ICE table for a reaction in which the reactant gases are mixed in a constant volume of an inert solvent with no products present initially: (1 pt each blank, 9 pts total)



If the initial concentration of the N₂(g) is 0.789 M, and the initial concentration of O₂(g) is 0.899 M. If at equilibrium, the concentration of the NO is 0.230 M. Show the initial, change and equilibrium concentrations for all 3 reagents .

	[N ₂]	[O ₂]	[NO]
Initial			
Change			
Equilibrium			