Name:_____

Acids/Bases and Chemical Equilibrium
Remediation Video Solutions

Acids, Bases & Conjugates

Identify the following compounds as acids, bases, conjugate acid or conjugate base

$KOH + HNO_3 \Rightarrow KNO_3 + H_2O$
Base Acid CB CA

$HCl + H_2O \Rightarrow Cl^- + H_3O^+$
Acid Base CB CA

$NH_3 + H_2SO_4 \Rightarrow SO_4^{-2} + NH_4^+$
Base Acid CB CA

LeChatelier's Principle

Use arrows to indicate how the indicated changes will effect the concentration of the following substances:

$2\ C_2H_6 + 7\ O_2 \Rightarrow 4\ CO_2 + 6\ H_2O + heat$

Change = increase $[O_2]$
$[C_2H_6] \Downarrow$
heat $\Uparrow$
$[CO_2] \Uparrow$

$2\ H_2O + heat \Rightarrow 2H_2 + O_2$

Change = decrease $[H_2]$
temperature $\Downarrow$
$[H_2O] \Downarrow$
$[O_2] \Uparrow$

$Br_2 + CaCl_2 \Rightarrow Cl_2 + CaBr_2 + heat$

Change = increase heat
$[CaBr_2] \Downarrow$
$[CaCl_2] \Uparrow$
$[Cl_2] \Downarrow$

Reaction Rates and Collision Theory

Indicate if the following changes will increase or decrease the rate of the reaction and then explain why based on the collision theory of reaction rates. Use the terms frequency and magnitude of collisions.

Dilute the reactants

Diluting the reactants will decease the rate of the reaction because the particles will collide less frequently.

Increase temperature

Heating a reaction will increase the rate of the reaction because the particles will collide with greater energy (magnitude) and more frequently.

Take the reactant powder and form it into a round ball

Balling up the reactants will decease the rate of the reaction because the particles will collide less frequently.

Add a catalyst

Adding a catalyst will increase the rate of the reaction without changing the frequency or magnitude of the particles' collisions.

Add another substance which precipitates a reactant, removing it from solution

Precipitating a reactant will decease the concentration of that reactants, decreasing the rate of the reaction because the particles will collide less frequently.

Chemical Equilibrium

At equilibrium, the following reaction reaches these concentrations: 0.520M SO_3, 0.750M SO_2 and 0.430M O_2.

$$2SO_3 \rightleftharpoons 2SO_2 + O_2$$

Write the K_c expression for the reaction

$$K_c = \frac{[SO_2]^2[O_2]}{[SO_3]^2}$$

Calculate the K_c value for this reaction

$$K_c = \frac{[0.750M]^2[0.430M]}{[0.520M]^2}$$

$$K_c = 0.895$$

At equilibrium, does this reaction favor reactants or products? Explain your reasoning

At equilibrium, this reaction favors reactants. This conclusion is based on a K_c value smaller than 1.