

Name: _____

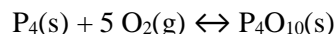
Period: _____

Seat#: _____

Directions: Show all work in a way that would earn you credit on the AP Test! This is always the rule! Some answers are provided at the end in italics and underlined>. If you need more space, use binder paper and staple to your worksheet.

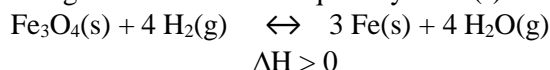
1999 NChO Exam

- 33) What is the equilibrium expression for this reaction?



- (A) $K_c = [\text{P}_4\text{O}_{10}] / [\text{P}_4] [\text{O}_2]^5$
(B) $K_c = [\text{P}_4\text{O}_{10}] / 5 [\text{P}_4] [\text{O}_2]$
(C) $K_c = [\text{O}_2]^5$
(D) $K_c = 1 / [\text{O}_2]^5$

- 34) For this reaction at equilibrium, which changes will increase the quantity of Fe(s)?



1. increasing temperature
2. decreasing temperature
3. adding Fe₃O₄(s)

- (A) 1 only
(B) 1 and 2 only
(C) 2 and 3 only
(D) 1, 2, and 3

1998 NChO Exam

- 31) Which reaction characteristics are changing by the addition of a catalyst to a reaction to a reaction at constant temperature?

1. activation energy
2. equilibrium concentrations
3. reaction enthalpy

- (A) 1 only
(B) 3 only
(C) 1 and 2 only
(D) 1, 2, and 3

- 32) Which reaction characteristics will be affected by a change in temperature?

1. value of equilibrium constant
2. equilibrium concentrations

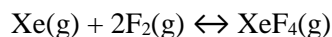
- (A) 1 only
(B) 2 only
(C) 1 and 2 only
(D) neither 1 nor 2

1997 NChO Exam

- 32) What is the relationship between the equilibrium constant (K_c) of a reaction and the rate constants for the forward (k_f) and backward (k_b) steps?

- (A) $K_c = k_f k_b$
(B) $K_c = k_b / k_f$
(C) $K_c = k_f / k_b$
(D) $K_c = 1 / (k_f k_b)$

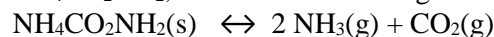
- 33) Xenon tetrafluoride, XeF₄, can be prepared by heating Xe and F₂ together according to this equation. What is the equilibrium expression for this reaction?



- (A) $K = [\text{XeF}_4] / ([\text{Xe}] [\text{F}_2])$
(B) $K = [\text{XeF}_4] / (2[\text{Xe}] [\text{F}_2])$
(C) $K = [\text{XeF}_4] / ([\text{Xe}] [\text{F}_2]^2)$
(D) $K = ([\text{Xe}] [\text{F}_2]) / [\text{XeF}_4]$

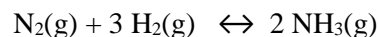
1996 NChO Exam

- 32) What is the equilibrium expression for the decomposition of ammonium carbamate, NH₄CO₂NH₂, that occurs according to this equation:



- (A) $K = [\text{NH}_3][\text{CO}_2]$
(B) $K = [\text{NH}_3]^2[\text{CO}_2]$
(C) $K = [\text{NH}_3][\text{CO}_2] / [\text{NH}_4\text{CO}_2\text{NH}_2]$
(D) $K = [\text{NH}_3]^2[\text{CO}_2] / [\text{NH}_4\text{CO}_2\text{NH}_2]$

- 33) Which factors will affect both the position of equilibrium and the value of the equilibrium constant for this reaction? The $\Delta H = -92 \text{ kJ}$



- (A) increasing the volume of the container
(B) adding N₂
(C) removing NH₃
(D) lowering the temperature