***Equilibrium***

*Basic Overview*

With reaction aA + bB ➝ cC + dD:

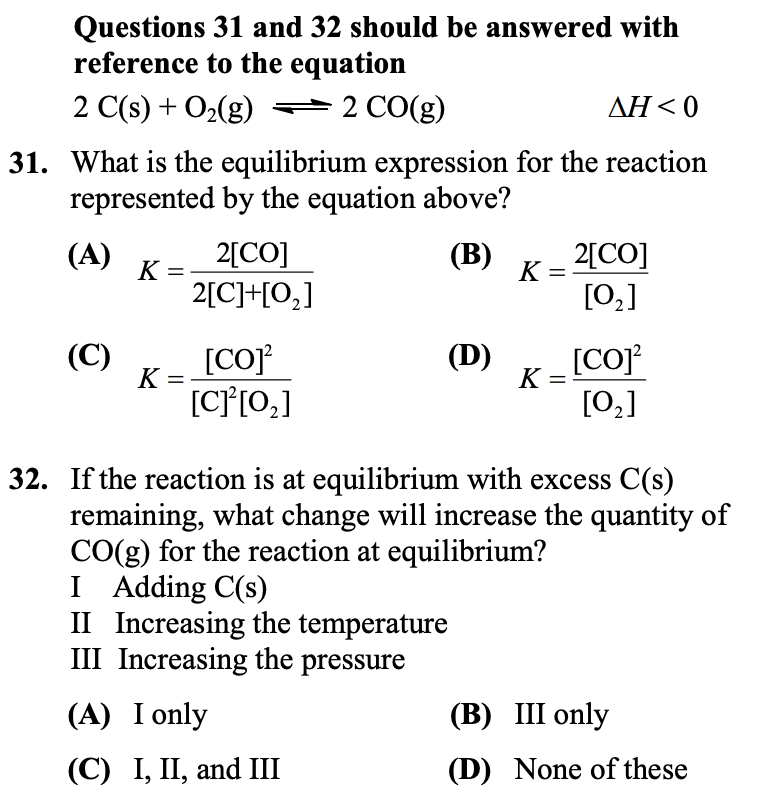
(*Δn* = prod. - reac. moles)

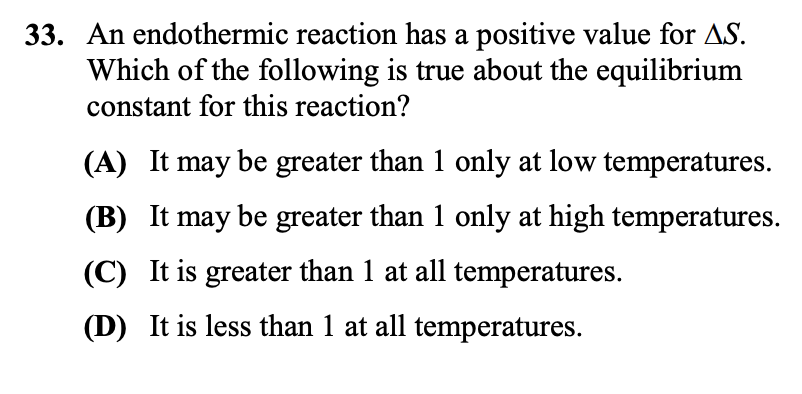
Le Chatelier's Principle: Changing temperature, volume, or moles in equilibrium will cause a shift in the opposite direction.

* Q > K => reaction goes reverse
* Q = K => equilibrium
* Q < K => reaction goes forward
* exothermic + T increase -> reverse
* endothermic + T increase -> forward

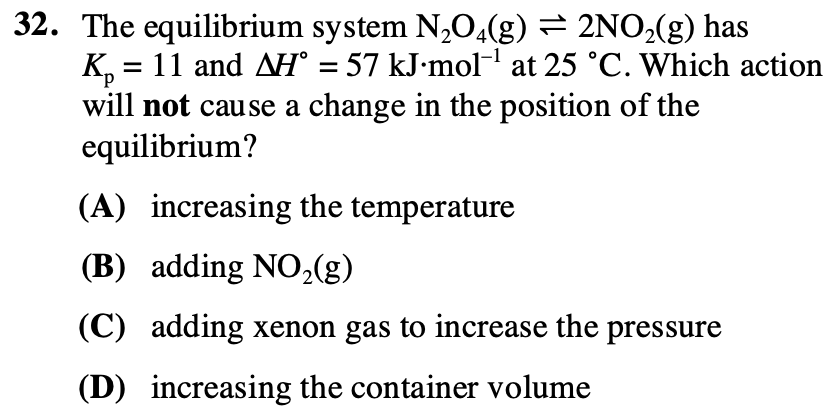
*Practice Problems*

**2014 USNCO Local**

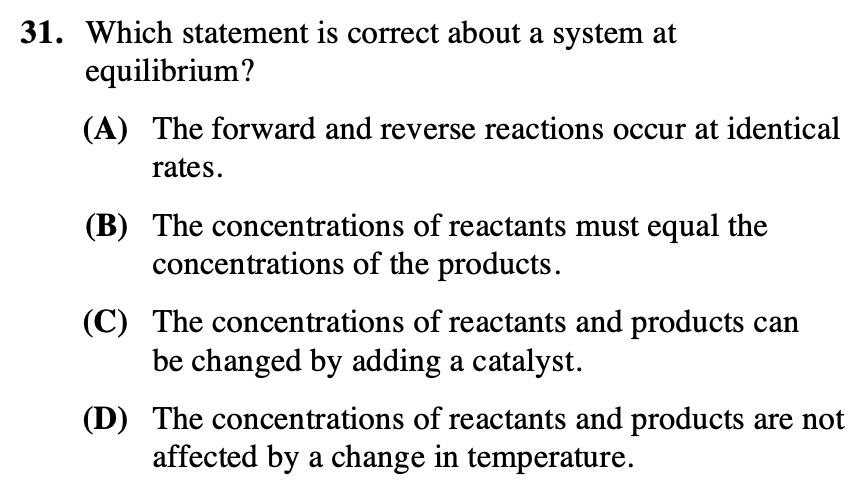


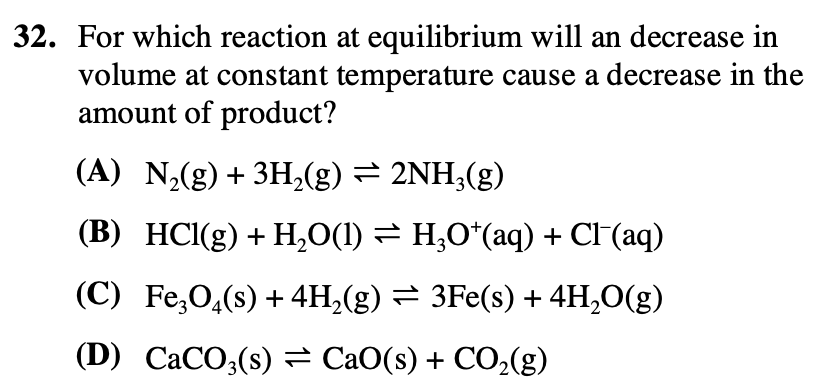


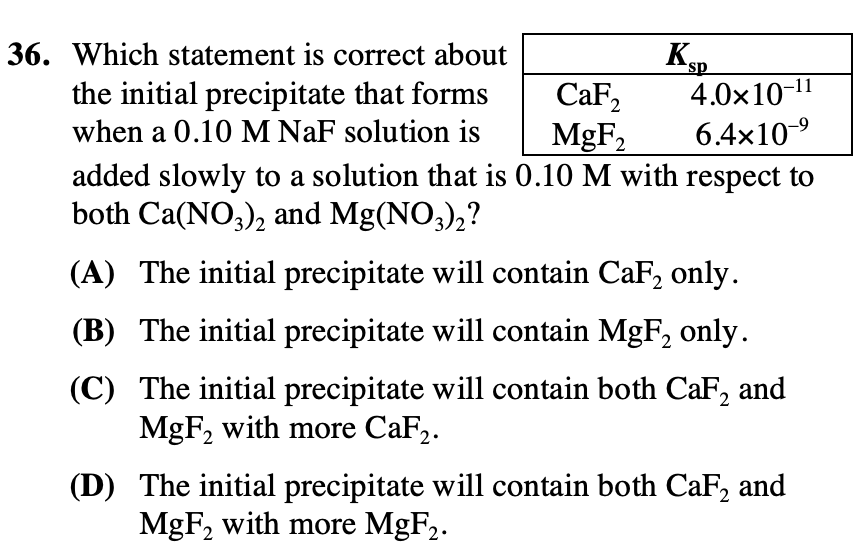
**2009 USNCO Local**



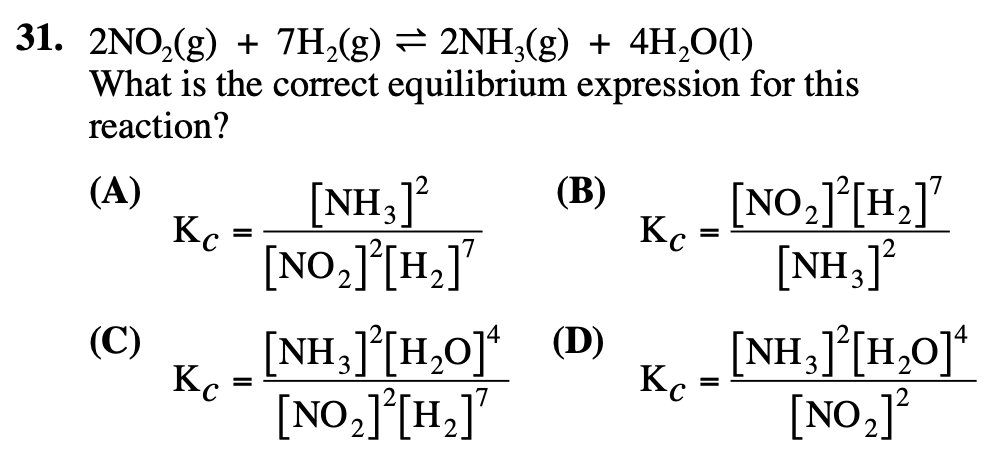
**2008 USNCO Local**



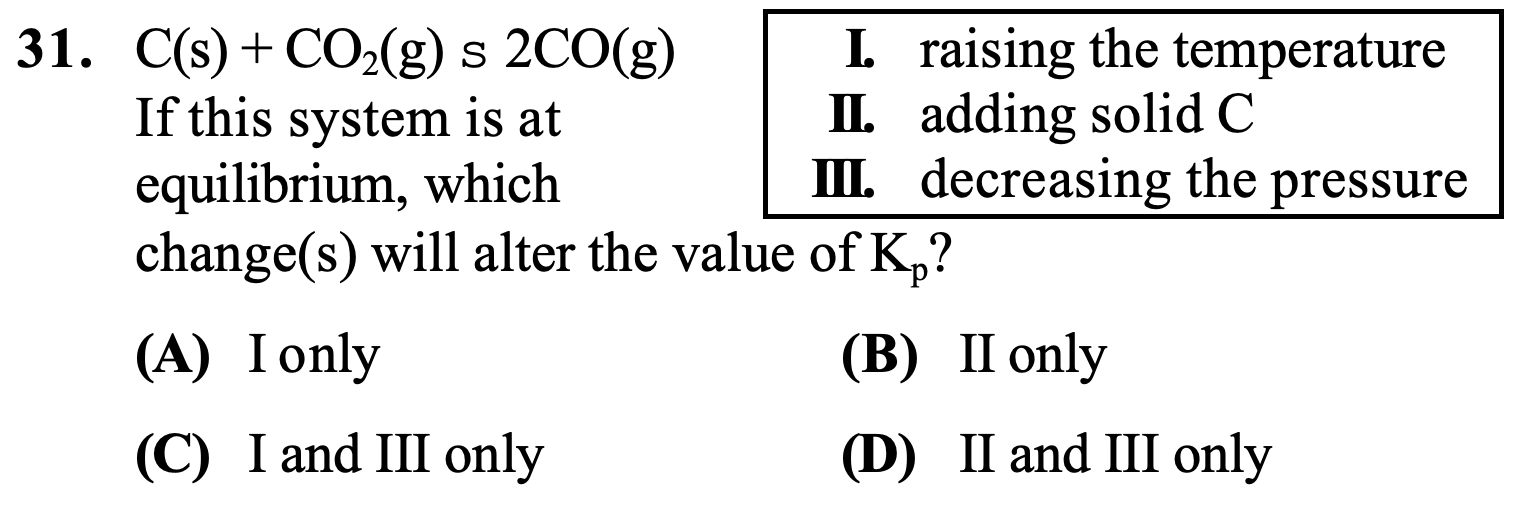




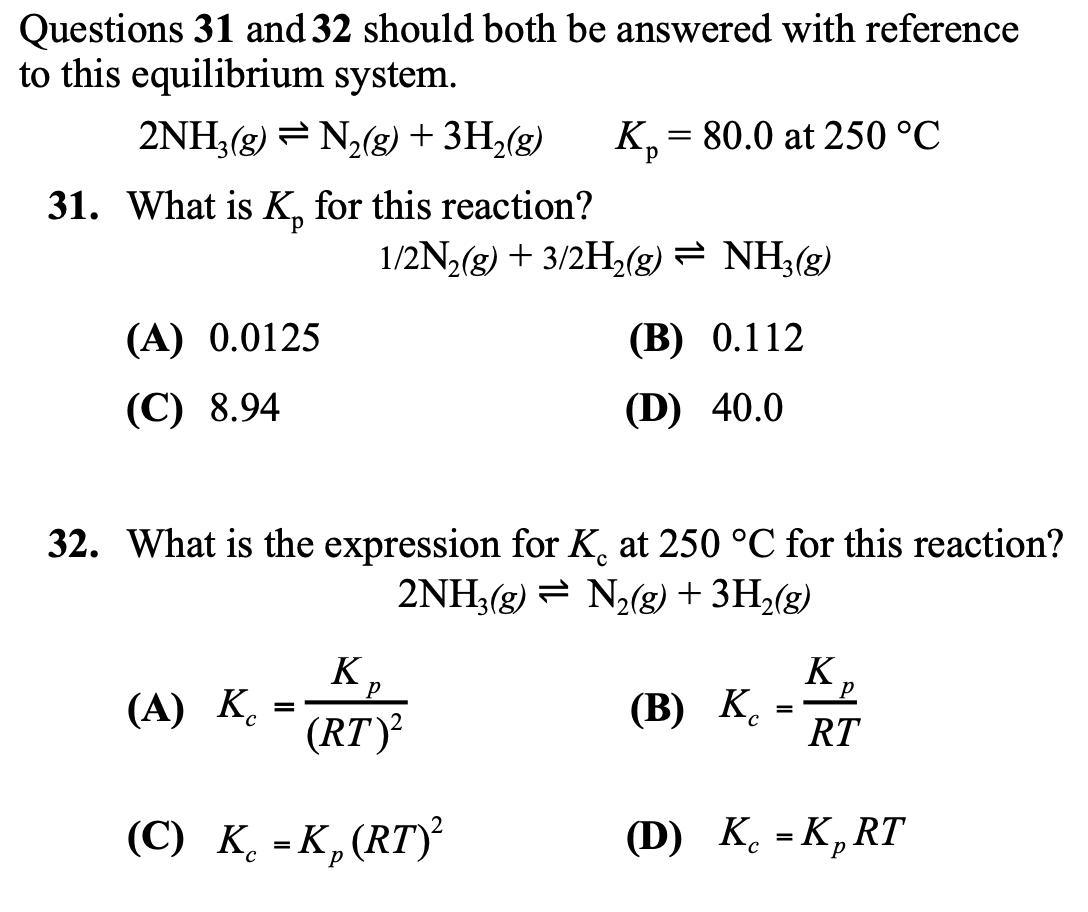
**2006 USNCO Local**



**2006 USNCO National**

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**2001 USNCO National**

****

***ANSWER KEYS***

*2014 USNCO Local*

31. D

32. D

33. B

36. C

*2009 USNCO Local*

32. C

*2008 USNCO Local*

31. A

32. C

36. D

*2006 USNCO Local*

31. A

*2001 USNCO National*

31. A

*2001 USNCO National*

31. B

32. A