

Chemical Eq'm Worksheet

(A)

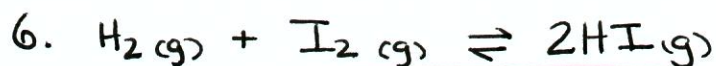
1. b

2. c

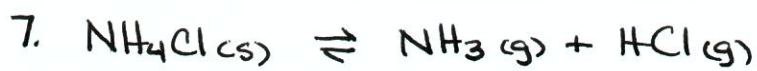
3. a

4. e

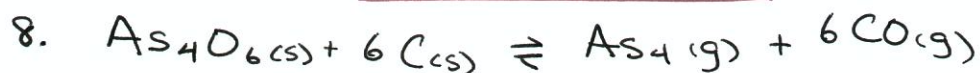
5. d



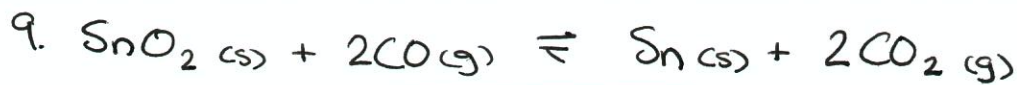
$$K = \frac{[\text{HI}]^2}{[\text{H}_2][\text{I}_2]}$$



$$K = [\text{NH}_3][\text{HCl}]$$



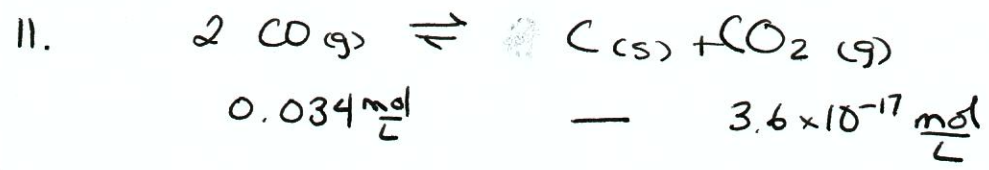
$$K = [\text{As}_4][\text{CO}]^6$$



$$K = \frac{[\text{CO}_2]^2}{[\text{CO}]^2}$$



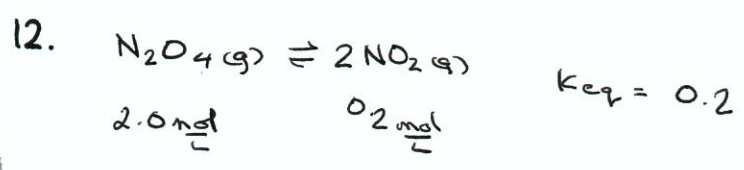
$$K = [\text{CO}_2]$$



$K_{eq} = 7.7 \times 10^{-15}$

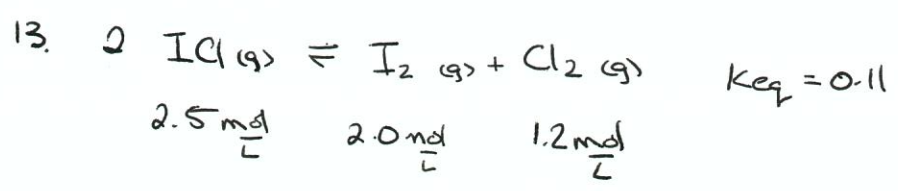
$Q = \frac{[\text{CO}_2]}{[\text{CO}]^2}$
 $= \frac{(3.6 \times 10^{-17})}{(0.034)^2}$
 $= 3.11 \times 10^{-14}$

$Q < K_{eq}$
 \therefore shifts right



$Q = \frac{[\text{NO}_2]^2}{[\text{N}_2\text{O}_4]} = \frac{(0.2)^2}{2} = 0.02$

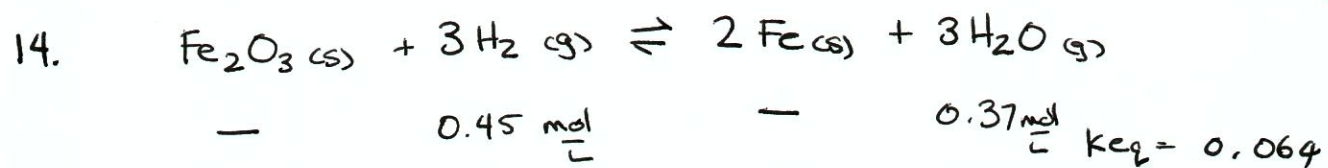
$K_{eq} > Q$
 not at eqm shifts right



$Q = \frac{[\text{Cl}_2][\text{I}_2]}{[\text{ICl}]^2} = \frac{(2)(1.2)}{(2.5)^2} = 0.384$

$Q > K_{eq}$
 \therefore not at eqm shifts left

14.
15.



$$Q = \frac{[\text{H}_2\text{O}]^3}{[\text{H}_2]^3} = \frac{(0.37)^3}{(0.45)^3} = 0.556$$

$Q > K_{\text{eq}} \therefore$ shifts left
not at eq'm

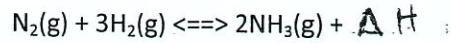
15. a

16. c

17. b

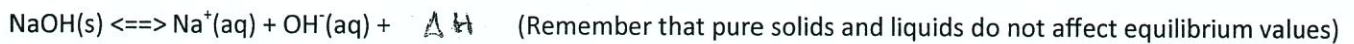
(D)

Complete the following charts by writing left, right or none for equilibrium shift, and decreases, increases or remains the same for the concentrations of reactants and products and for the value of K.



Stress	Equilibrium Shift	[N ₂]	[H ₂]	[NH ₃]	K
18. Add N ₂	right	-----	decreases	increases	Remains the same
19. Add H ₂	right	decreases	-----	increases	"
20. Add NH ₃	left	increases	increases	-----	"
21. Remove N ₂	left	-----	"	decreases	"
22. Remove H ₂	left	increases	-----	"	"
23. Remove NH ₃	right	decreases	decreases	-----	"
24. Increase Temperature	left	↑	↑	↓	decreases
25. Decrease Temperature	right	↓	↓	↑	increases
26. Increase Pressure	right	↓	↓	↑	stays the same
27. Decrease Pressure	left	↑	↑	↓	"

by volume change



Stress	Equilibrium Shift	Amount NaOH(s)	[Na ⁺]	[OH ⁻]	K
28. Add NaOH(s)	—	-----	same	same	—
29. Add NaCl (adds Na ⁺)	←	↑	-----	↓	—
30. Add KOH (Adds OH ⁻)	←	↑	↓	-----	—
31. Add H ⁺ (Removes OH ⁻)	→	↓	↑	-----	—
32. Increase Temperature	→	↓	↑	↑	↑
33. Decrease Temperature	←	↑	↓	↓	↓
34. Increase Pressure	—	—	—	—	—
35. Decrease Pressure	—	—	—	—	—