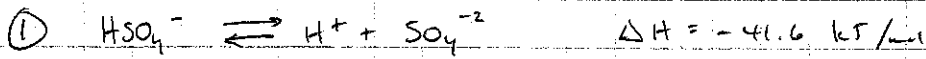


# Equilibrium Test - Key



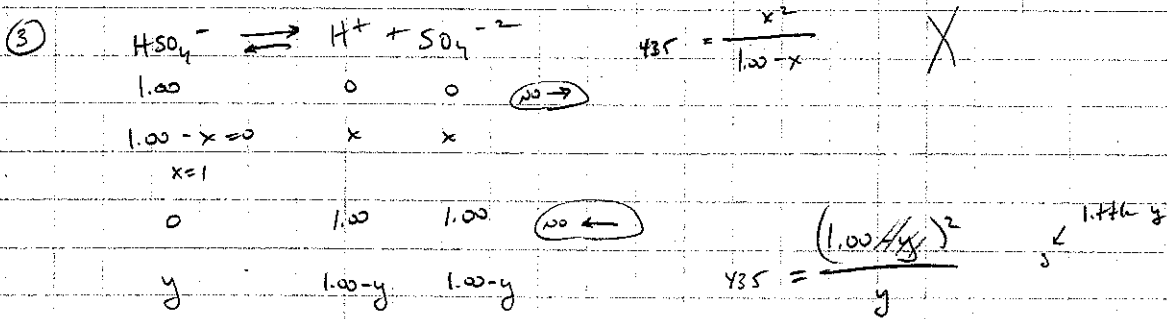
a) P ↑ no shift b/c no gases

b) heat is product, adding heat pushes rxn ←, so  $[\text{SO}_4^{2-}] \downarrow$

c) H<sup>+</sup> added, more H<sup>+</sup>/SO<sub>4</sub><sup>2-</sup> collisions, rxn ←,  $[\text{HSO}_4^-] \uparrow$

d)  $\text{Ba}^{2+} + \text{SO}_4^{2-} \rightarrow \text{BaSO}_4$  removes  $\text{SO}_4^{2-}$  so  
rxn goes →,  $[\text{HSO}_4^-] \downarrow$

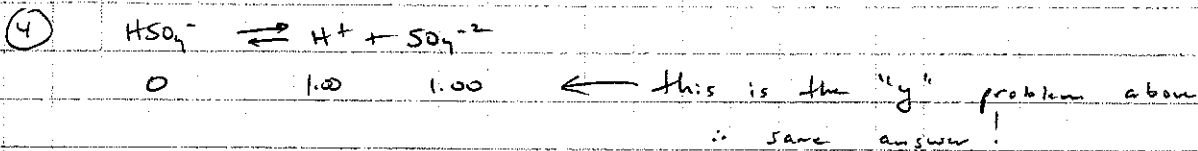
②  $K = \frac{[\text{H}^+][\text{SO}_4^{2-}]}{[\text{HSO}_4^-]} = \frac{(1.40)(2.43 \times 10^{-8})}{(2.00)} = 1.70 \times 10^{-8}$

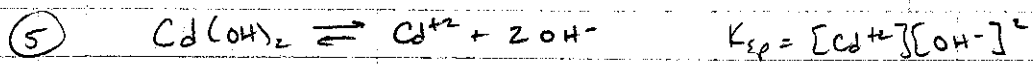


$y = \frac{(1)^2}{435} = .0023$

$[\text{HSO}_4^-] = .0023 \text{ M}$

$[\text{H}^+] = [\text{SO}_4^{2-}] = 1.00$





some                    0                    0                    no  $\rightarrow$   
some - x                x                    2x

$$1.2 \times 10^{-14} = (x)(2x)^2$$
$$= 4x^3$$

$$1.44 \times 10^{-5} \text{ M} = x$$

$$[\text{OH}^-] = 2x = 2.88 \times 10^{-5} \text{ M}$$

6)

$$1.2 \times 10^{-14} \stackrel{?}{=} [3.8 \times 10^{-6}][4.4 \times 10^{-3}]^2$$

$$1.2 \times 10^{-14} < 8.04 \times 10^{-11}$$

yes