

Chapter 6 problem 19, 21, 41, & 53 answers

Note:  $1.0\text{e-}1 = 1.0 \times 10^{-1}$

**6-19 a)**

CaSO <sub>4</sub>	=	Ca <sup>2+</sup>	+	SO <sub>4</sub> <sup>2-</sup>
--		x		x

$$K_{sp} = 2.4\text{e-}5 = x^2 \quad x = 4.90\text{e-}3 \text{ M} \quad \text{MW} = 136.14 \text{ g/mol} \quad x = 0.67 \text{ g/L}$$

b)

CaSO <sub>4</sub>	=	Ca <sup>2+</sup>	+	SO <sub>4</sub> <sup>2-</sup>
--		0.50		0
--		0.50 + x		x

$$K_{sp} = 2.4\text{e-}5 = (0.50 + x)x \approx 0.50x \quad x = 4.8\text{e-}5 \text{ M} = 6.5\text{e-}3 \text{ g/L}$$

**6-21 a)**

Zn <sub>2</sub> Fe(CN) <sub>6</sub>	=	2 Zn <sup>2+</sup>	+	Fe(CN) <sub>6</sub> <sup>2-</sup>
--		2x		x

$$K_{sp} = 2.1\text{e-}16 = x(2x)^2 \quad x = 3.74\text{e-}6 = 1.3\text{e-}3 \text{ g/L}$$

b)

Zn <sub>2</sub> Fe(CN) <sub>6</sub>	=	2 Zn <sup>2+</sup>	+	Fe(CN) <sub>6</sub> <sup>2-</sup>
--		0.040		0
--		0.040 + 2x		x

$$K_{sp} = 2.1\text{e-}16 = x(0.040 + 2x)^2 \approx x(0.040)^2 \quad x = 1.3\text{e-}13$$

c)

Zn <sub>2</sub> Fe(CN) <sub>6</sub>	=	2 Zn <sup>2+</sup>	+	Fe(CN) <sub>6</sub> <sup>2-</sup>
--		5.0e-7 M		x

$$K_{sp} = 2.1\text{e-}16 = (5.0\text{e-}7)^2(x) \quad x = [\text{K}_2\text{Fe(CN)}_6] = 8.4\text{e-}4 \text{ M}$$

**6-41 a)** pH = 2.00                      b) pH = 12.54 remember  $[\text{H}^+] = K_w/[\text{OH}^-]$

c) pH = 1.52                              d) pH = -0.48                              e) pH = 12.00

**6-52) a & c**