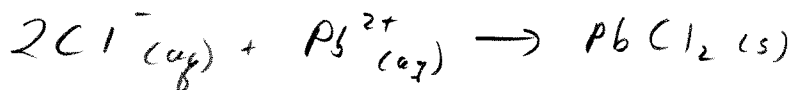
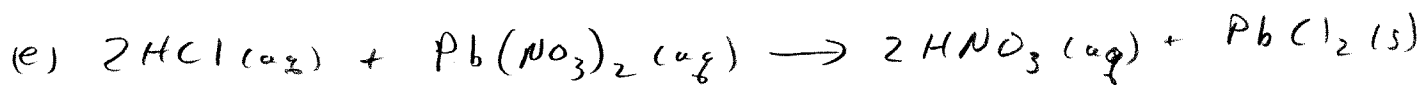
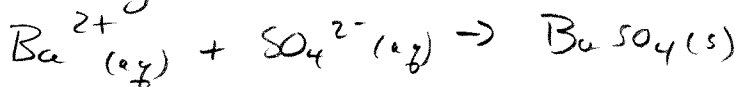
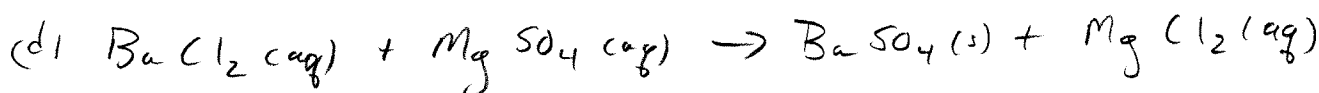
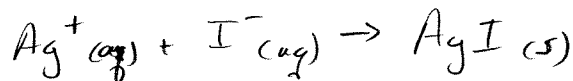
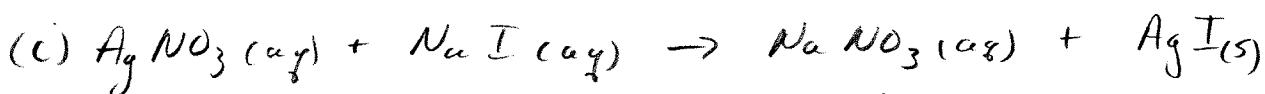
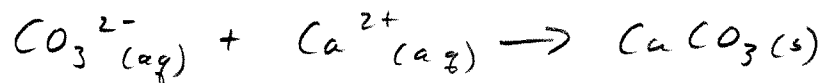
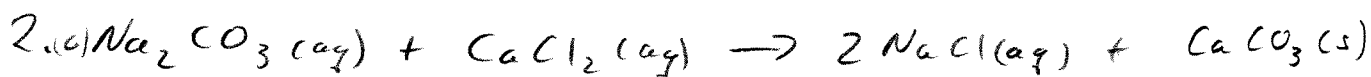


Solubility Products Worksheet # 2

1. (a), (c), (e) - insoluble

(b), (d) - soluble



$$3. (a) K_{sp} = [\text{Fe}^{3+}][\text{OH}^-]^3$$

$$(b) K_{sp} = [\text{Ca}^{2+}]^3[\text{PO}_4^{3-}]^2$$

$$(c) K_{sp} = [\text{Ag}^+][\text{Cl}^-]^2$$

$$(d) K_{sp} = [\text{Ba}^{2+}][\text{F}^-]^2$$

$$(e) K_{sp} = [\text{Bi}^{3+}]^2[\text{S}^{2-}]^3$$

$$4. (a) \quad k_{sp} = [Mg^{2+}][F^-]^2$$

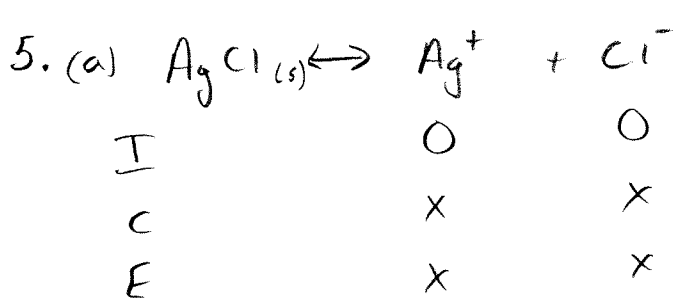
$$= (0.0012 \text{ mol/L}) (2 \times 0.0012 \text{ mol/L})^2 = \underline{6.91 \times 10^{-9}}$$

$$(b) \quad k_{sp} = [Pb][S]$$

$$= (1.84 \times 10^{-14} \text{ mol/L}) (1.84 \times 10^{-14} \text{ mol/L}) = \underline{3.39 \times 10^{-28}}$$

$$(c) \quad k_{sp} = [Ca^{2+}][F^-]^2$$

$$= (2.15 \times 10^{-4} \text{ mol/L}) (2 \times 2.15 \times 10^{-4} \text{ mol/L})^2 = \underline{3.98 \times 10^{-11}}$$

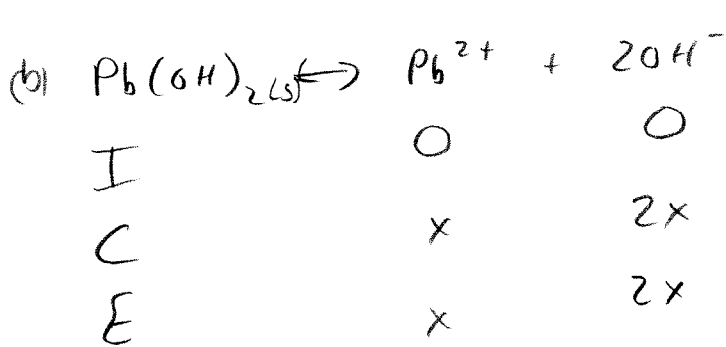


$$k_{sp} = [Ag^+][Cl^-]$$

$$1.7 \times 10^{-16} = (x)(x)$$

$$1.7 \times 10^{-16} = x^2$$

$$x = \underline{1.3 \times 10^{-8} \text{ mol/L}}$$



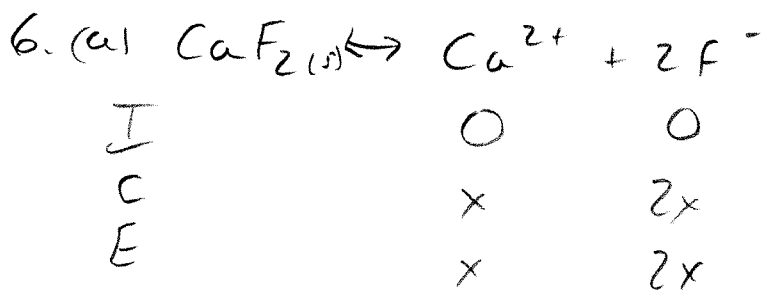
$$k_{sp} = [Pb^{2+}][OH^-]^2$$

$$4.2 \times 10^{-15} = (x)(2x)^2$$

$$4.2 \times 10^{-15} = 4x^3$$

$$1.05 \times 10^{-15} = x^3$$

$$x = \underline{1.02 \times 10^{-5} \text{ mol/L}}$$



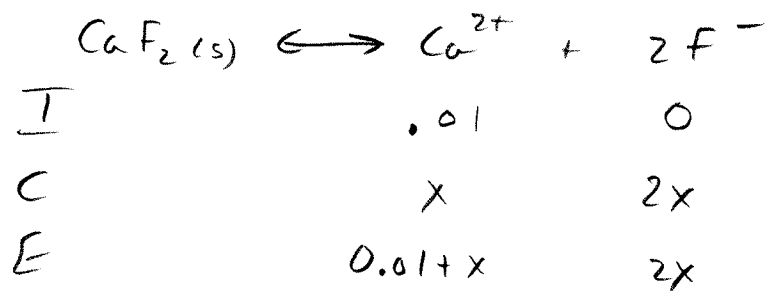
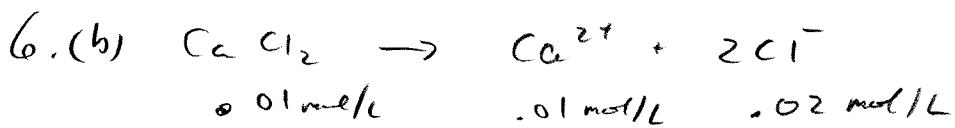
$$k_{sp} = [Ca^{2+}][F^-]^2$$

$$3.4 \times 10^{-11} = x(2x)^2$$

$$3.4 \times 10^{-11} = 4x^3$$

$$8.5 \times 10^{-12} = x^3$$

$$x = \underline{2.04 \times 10^{-4} \text{ mol/L}}$$

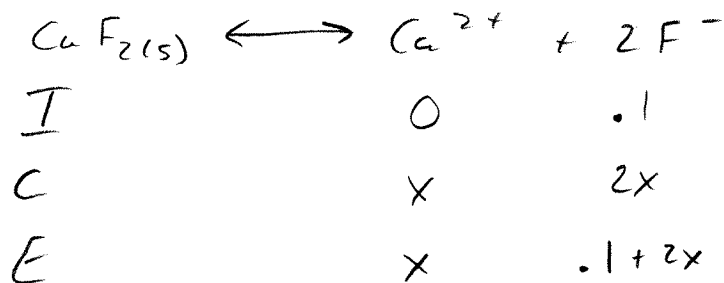
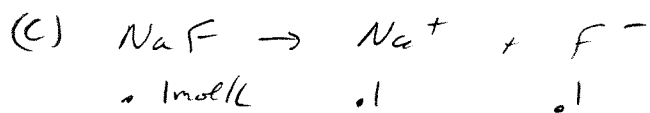


$$K_{sp} = [\text{Ca}^{2+}][\text{F}^-]^2$$

$$3.4 \times 10^{-11} = (0.01 + x)(2x)^2$$

$$3.4 \times 10^{-11} = .04x^2$$

$$x = \underline{2.92 \times 10^{-5} \text{ mol/L}}$$

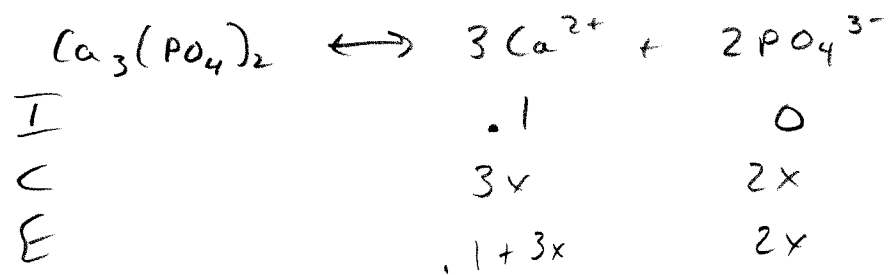


$$K_{sp} = [\text{Ca}^{2+}][\text{F}^-]^2$$

$$3.4 \times 10^{-11} = (x)(.1+2x)^2$$

$$3.4 \times 10^{-11} = .01x$$

$$x = \underline{3.4 \times 10^{-9} \text{ mol/L}}$$

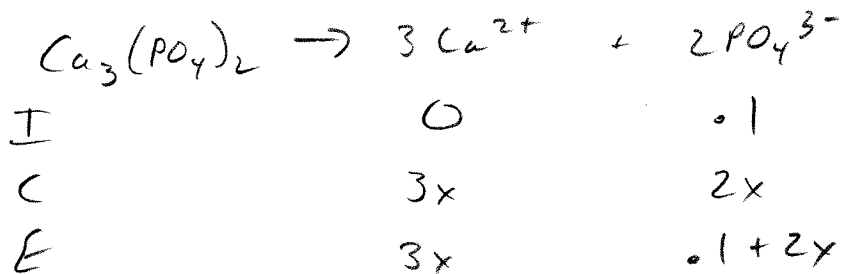
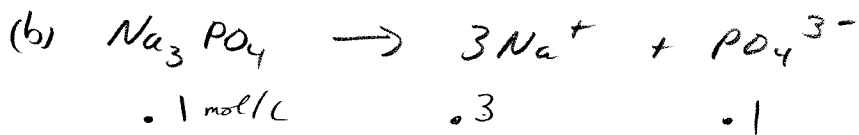


$$K_{sp} = [\text{Ca}^{2+}]^3 [\text{PO}_4^{3-}]^2$$

$$1.3 \times 10^{-32} = (.1 + 3x)^3 (2x)^2$$

$$1.3 \times 10^{-32} = (.001) 4x^2$$

$$x = 1.8 \times 10^{-15} \text{ mol/L}$$



$$K_{sp} = [\text{Ca}^{2+}]^3 [\text{PO}_4^{3-}]^2$$

$$1.3 \times 10^{-32} = (3x^3) (.1 + 2x)^2$$

$$1.3 \times 10^{-32} = 0.27 x^3$$

$$x = 3.64 \times 10^{-11} \text{ mol/L}$$
