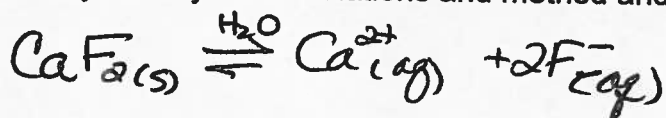


Assume all solutions are aqueous at 25°C. $K_w = 1.0 \times 10^{-14}$

1. Which of the following sparingly soluble salts will be more soluble in acid than in water? Circle your choice(s). (10 pts)

a) AgBr b) PbSO₄ c) BaCO₃ d) Hg₂I₂ e) FeS

2. The solubility product for CaF₂ at 25°C is 1.5×10^{-10} . Will a precipitate of calcium fluoride form if 10.00 mL of 0.00150 M Ca(NO₃)₂ is added to 20.00 mL of 0.0250 M KF? Clearly show your calculations and method and explain your reasoning. (10 pts)



$$[\text{Ca}^{2+}] = \frac{10.00 \text{ mL } (0.00150 \text{ M})}{30.00 \text{ mL}} = 5.00 \times 10^{-4} \text{ M}$$

$$[\text{F}^{-}] = \frac{20.00 \text{ mL } (0.0250 \text{ M})}{30.00 \text{ mL}} = 1.67 \times 10^{-2} \text{ M}$$

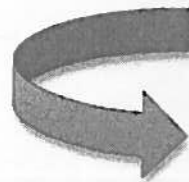
$$K_{sp} = [\text{Ca}^{2+}][\text{F}^{-}]^2 = 1.5 \times 10^{-10}$$

$$Q = (5.00 \times 10^{-4})(1.67 \times 10^{-2})^2 = 1.39 \times 10^{-7}$$

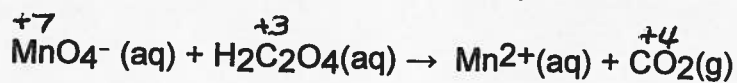
Since $Q > K_{sp}$, a precipitate will form.

3. The oxidation state of Cr in $\overset{+12}{\text{Cr}_2\text{O}_7}{}^{2-}$ is: +6 (4 pts)

The oxidation state of C in $\overset{-2(3)}{\text{CO}_3}{}^{2-}$ is: +4 (4 pts)

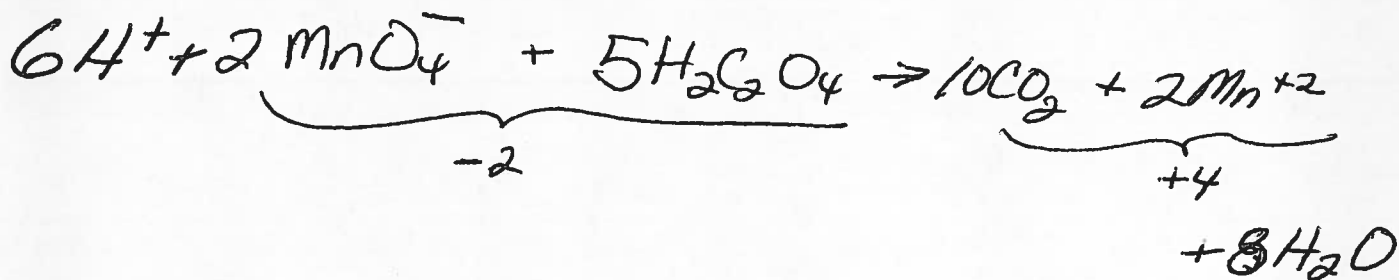
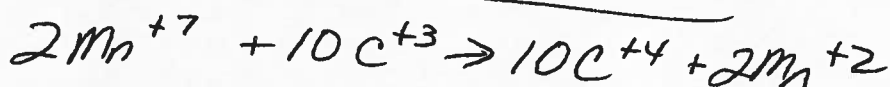
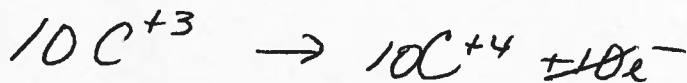
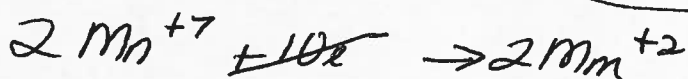
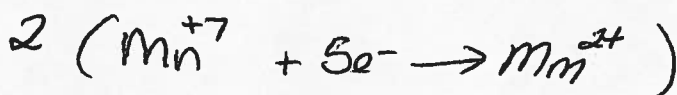
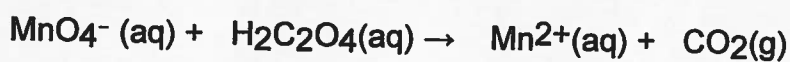


4. What element is being oxidized in the following redox reaction? (2 pts)



C is oxidized; Mn is reduced

5. Balance the following redox reaction if it occurs in acidic solution. Show your method. (10 pts)



check

2 Mn 2

10 C 10

16 H 16

28 O 28 ✓