Assignment #27

17.4 *(a) Compute the voltage at 25°C of an electrochemical cell consisting of pure cadmium immersed in a 2×10^{-3} M solution of Cd^{2+} ions and pure iron in a 0.4 M solution of Fe^{2+} ions.*

(b) Write the spontaneous electrochemical reaction.

17.8 *For the following pairs of alloys that are coupled in seawater, predict the possibility of corrosion; if corrosion is probable, note which metal/alloy will corrode.*

(a) Aluminum and magnesium

(b) Zink and low-carbon steel

(c) Inconel 600 and nickel 200

(d) Titanium and stainless steel

(e) Cast iron and 316 stainless steel

17.11 *A piece of corroded metal alloy plate was found in a submerged ocean vessel. It was estimated that the original area of the plate was 10 in^2 and that approximately 2.6 kg had corroded away during the submersion. Assuming a corrosion penetration rate of 200 mpy for this alloy in seawater, estimate the time of submersion in years. The density of the alloy is 7.9 g/cm^3.*