***Chemistry***

**17: Electrochemistry**

**17.7: Electrolysis**

49. What mass of each product is produced in each of the electrolytic cells of the previous problem if a total charge of 3.33  105 C passes through each cell? Assume the voltage is sufficient to perform the reduction.

Solution

The charge given in the problem corresponds to 

(a)



(b)



(c)



(d)



51. A current of 2.345 A passes through the cell shown in Figure 17.20 for 45 minutes. What is the volume of the hydrogen collected at room temperature if the pressure is exactly 1 atm? Assume the voltage is sufficient to perform the reduction. (Hint: Is hydrogen the only gas present above the water?)

Solution

Water vapor and hydrogen gas will be collected, so the *total* pressure is exactly 1 atm. Using the data in Appendix E, determine that the vapor pressure of water at room temperature is 24.0 mm Hg, or 0.0316 atm. The pressure of the hydrogen gas is then 0.9684 atm. From the figure, 2 moles of electrons are required per mole of hydrogen gas produced so that



Using the ideal gas equation with , the pressure of the hydrogen, and reducing the value because the efficiency is only 95%, gives:



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