Answer EITHER Question 2 below OR Question 3 printed on pages 8 and 9. Only one of these two questions will be graded. If you start both questions, be sure to cross out the question you do not want graded. The Section II score weighting for the question you choose is 20 percent.
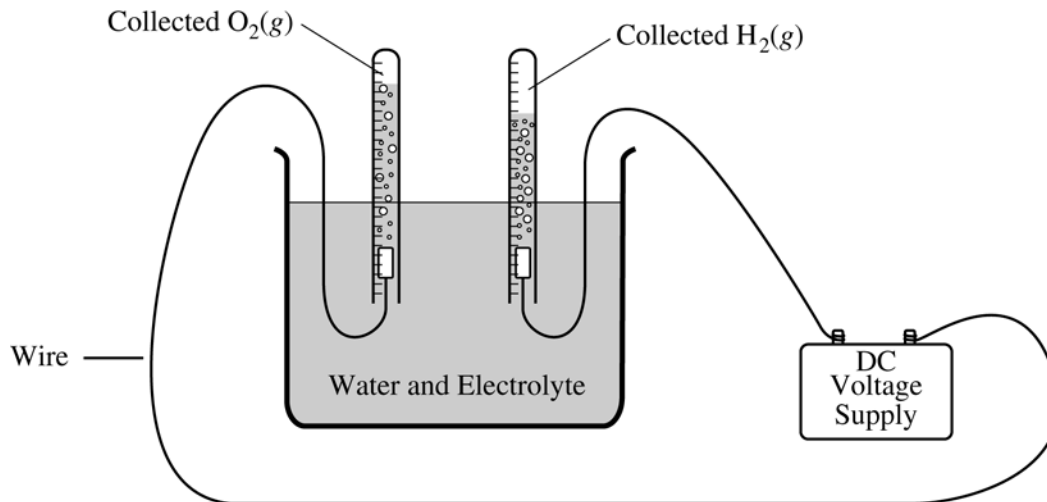
2. Water was electrolyzed, as shown in the diagram above, for 5.61 minutes using a constant current of 0.513 ampere. A small amount of nonreactive electrolyte was added to the container before the electrolysis began. The temperature was 298 K and the atmospheric pressure was 1.00 atm.

(a) Write the balanced equation for the half reaction that took place at the anode.

(b) Calculate the amount of electric charge, in coulombs, that passed through the solution.

(c) Why is the volume of $O_2(g)$ collected different from the volume of $H_2(g)$ collected, as shown in the diagram?

(d) Calculate the number of moles of $H_2(g)$ produced during the electrolysis.

(e) Calculate the volume, in liters, at 298 K and 1.00 atm of dry $H_2(g)$ produced during the electrolysis.

(f) After the hydrolysis reaction was over, the vertical position of the tube containing the collected $H_2(g)$ was adjusted until the water levels inside and outside the tube were the same, as shown in the diagram below. The volume of gas in the tube was measured under these conditions of 298 K and 1.00 atm, and its volume was <u>greater</u> than the volume calculated in part (e). Explain.

GO ON TO THE NEXT PAGE.