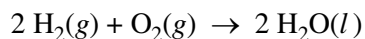


2007 AP[®] CHEMISTRY FREE-RESPONSE QUESTIONS (Form B)



3. In a hydrogen-oxygen fuel cell, energy is produced by the overall reaction represented above.
- (a) When the fuel cell operates at 25°C and 1.00 atm for 78.0 minutes, 0.0746 mol of $\text{O}_2(\text{g})$ is consumed. Calculate the volume of $\text{H}_2(\text{g})$ consumed during the same time period. Express your answer in liters measured at 25°C and 1.00 atm.
- (b) Given that the fuel cell reaction takes place in an acidic medium,
- (i) write the two half reactions that occur as the cell operates,
 - (ii) identify the half reaction that takes place at the cathode, and
 - (iii) determine the value of the standard potential, E° , of the cell.
- (c) Calculate the charge, in coulombs, that passes through the cell during the 78.0 minutes of operation as described in part (a).

S T O P

**If you finish before time is called, you may check your work on this part only.
Do not turn to the other part of the test until you are told to do so.**