A student conducts a redox titration using a strong oxidizing agent, potassium permanganate and hydrogen peroxide. The balanced redox reaction is shown below:

2MnO4-(aq) + 5H2O2(aq) + 6H+(aq) 🡪 2Mn+2(aq) + 5O2(g) + 8H2O(l)

A. What reactant is oxidized?

What reactant is reduced?

B What is the mole ratio of hydrogen peroxide to permanganate ion in the balanced equation?

The following data was obtained by the student in three trials of his experiment, using 1.00 gram of 3.00% hydrogen peroxide solution.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Trial 1 | Trial 2 | Trial 3 |
| Molarity of KMnO4 | 0.0250M | 0.0250M | 0.0250M |
| Initial volume of KMnO4 solution in buret | 4.10 ml | 18.75 ml | 33.55 ml |
| Final volume of KMnO4 solution in buret | 18.75 ml | 33.55 ml | 45.32 ml |
| Volume of KMnO4 solution added to buret | 14.65 ml | 14.80ml | 14.42 ml |

C. Mulitply the molarity of the KMnO4 solution by the volume (in Liters) added to the flask to calculate the number of moles of permanganate ion consumed for trial 1

D. Multiply the number of moles of permanganate ion by the mole ratio for hydrogen peroxide to determine the number of moles of hydrogen peroxide for trial 1

E. Multiply the number of moles of hydrogen peroxide by the molar mass of hydrogen peroxide to determine the number of grams of hydrogen peroxide in trial 1.

F. Divide the number of grams of hydrogen peroxide by the total mass of the hydrogen peroxide solution. See sentence above the data table. Multiply by 100 to obtain the percent of hydrogen peroxide. Assume the density of the solution is 1.00g/ml.

G. Determine the percent error of the student compared to the actual % hydrogen peroxide in the solution.