

**NOTE:** Use non-engineering format for this assignment (except for problem 5).

**Group Assignment:** The fabrication and testing of your pump were group assignments. The pump fabrication was completed in groups of two students, and pump testing was completed by groups of two to four students (two pump fabrication teams typically combine to test the better of two pumps). So, it is common for four students to share the same raw data from pump testing.

**Individual Assignment:** The pump project counts as a significant percentage of your overall grade, and the work that you submit for this grade must be your own. Please be aware that this assignment is not a “regular” homework assignment. You are allowed to discuss your work with other students, but no direct copying of work and no sharing of computer files is allowed (such as Excel and Mathcad files); please type in the raw data collected into Excel yourself. You may share photographs that you took of your group during fabrication and testing.

This assignment should include the following items:

1. a title page (signed with pledge statement)
2. a concise, well-written executive summary that includes . . .
  - a. a couple of introductory sentences describing the project
  - b. the maximum pump head (meters)
  - c. the peak flow rate (liters per minute)
  - d. typical voltage (V) and current measurements (A)
  - e. the peak efficiency (%) and the head (meters) at which the peak efficiency occurs
3. photos of you and your partner(s) during pump fabrication and testing
4. your Excel spreadsheet containing the raw data and computed values (including velocity, efficiency and flow rate)
5. a detailed hand calculation using engineering format showing all calculations for a single data point in your Excel spreadsheet (include units!!)
6. a plot of pump head versus (meters) flow rate (liters per minute) generated in Excel
7. a plot of pump efficiency (%) versus pump head (meters) generated in Excel

Be sure to put the items in the order listed (1, 2, 3, . . . 7) and do a “clean” job of presenting your work. A good part of your grade will be based on how well your executive summary is written. Don’t forget to use units in your table, calculations and plots.