1. Objectives not complete in introduction/conclusions – All your objectives must be clearly presented in the introduction. This should not be a re-typing of an assignment, but rather a carefully summarized narrative beginning with the most important (comprehensive) objective and continuing to include every important objective. The most important objective is usually related to the title of the lab in some way. Objectives not complete in conclusions (be quantitative) – In the conclusions, you must report quantitatively, on all your objectives. If you were to calculate something, there should be a number or a range of numbers in the conclusions that corresponds to that objective. No new material should be introduced in the conclusions. All new material should be in the discussion; the conclusions should summarize how the objectives turned out. They should have the same structure as the introduction since they cover the same material, but they should say how each objective turned out.

2. Organizational problems—The report must tell a story. It must begin with background and proceed with supporting information to its conclusions.
   a. Do not write a detailed procedure—The experimental section is a narration of your strategy; it is not a reiteration of your procedure. You should write prose as if you are telling a colleague how you planned to address your objectives. Indicate what experiments you ran and how; indicate how many replicates you performed.
   b. No new topics in conclusions—The conclusions are a summary of the report; there should be nothing new there. Mention everything important in the report and you may then summarize this in the conclusions, if appropriate.
   c. Needed graphs/tables are in appendix (all needed graphs/tables go in report) – Your reader should be able to understand the report completely without the appendices. Imagine the reader ripping off the appendices in order to lighten the report for a trip. Do not put anything essential in the appendix; put it in the report.

3. Problems with writing:
   a. Start each paragraph with a topic sentence – The first sentence of a paragraph is its topic sentence. This sentence should tell what the paragraph is about. When done with a report, you should be able to just read the topic sentences and tell what the report’s story is.
   b. Writing is unclear – Sentences must be clear. Try reading out loud to see if the sentence is clear; alternatively, have someone else read the report to see if it is clear.
   c. Grammar needs improvement – Grammar must be correct.
   d. Use past tense in a report – The only common exception to this is when you say what “is” in the report (that can be present tense). But you have already completed the lab; all of that must be in the past tense.
   e. Writing is wrong tone (too casual) – The writing in a report is business professional and must be formal.
   f. Omit trivial descriptions (only include what is necessary to repeat experiments) – Do not get bogged down in details that are not needed.
   g. No need for time-stamping events (e.g. first we did this, then this, then that) - If you find yourself using the structure “then we did the second step” try removing the word “then”. If it can survive without it, remove it.
h. No contractions (isn’t, shouldn’t etc.) - Using contractions is not business professional.
i. No need to say where figure/table/equation is (do not say “figure below” say “Figure 2”)
j. Avoid one-sentence paragraphs

4. Problems with graphs and tables. A picture is worth a thousand words. Design your graphs to have reasonable axes (label axes with even numbers or in multiples of 5; do not put gridlines unless essential; separate graphs that are to be compared must have the same axis scales, etc.
   a. Captions incomplete (always describe what is in figure/table in caption) Think of your graphic as standing alone. What does the reader need to know about the graphic in order to understand its significance? If it is a calibration curve for a device, name the device (e.g. rotameter at station 4)
   b. Figures/tables not mentioned (all figures and tables must be mentioned in text) – There should be no unmentioned graphics.
   c. Too high a degree used in polynomial trend-line fit (R^2=1 is a danger sign) – You should use the lowest order polynomial that reasonably fits your data. This is a judgment you will learn. If R^2 = 1, you may have too few degrees of freedom to justify the model you are using for your fit.
   d. Do not put a trendline where there is no trend – Trendlines are to be used for interpolation. If the trendline you put on a graph is not useful for interpolation (it makes no sense, for example) then do not put the trendline.
   e. No symbols on arbitrary points (if you picked the points to plot a function) – When plotting a function you choose various values of x and calculate the y’s. When you do this, there is no significance to which x’s are used. Therefore, do not put any symbols on those points. Choose enough points to get a smooth line and just put the line. This is what your calculator is doing automatically. Your calculator does not put symbols on function when it does this.
   f. Do put symbols on individual data points (if you took the data)— Do not “connect the dots” of individual data points. Each experimental point needs a distinct symbol.
   g. y is a function of x (not the other way around; x is the independent variable) – When we say, for example, plot head versus capacity, head is the dependent variable and it goes on the y-axis; capacity is the independent variable and it goes on the x-axis.

5. Problems with numbers/symbols:
   a. Wrong number of significant figures reported (usually too many) Use scientific notation if necessary to display the correct number of significant figures in your text, tables, and on the axes of your graphs. In engineering we only very rarely have more than three sig figs; usually we have two.
   b. Numbers missing from discussion (be quantitative) – Your discussions and comparisons must be quantitative. Your conclusions must be quantitative. Do not say “bigger” say 34% bigger.
   c. Symbols not identified (identify all symbols as you introduce them) – When you put in an equation, follow that equation with the definitions of all variables. Once a variable is defined, you do not need to define it again. Do not re-use the same symbols for any other variable in the report.
   d. Equations not presented right after they are mentioned – if you say eqn 1, put eqn 1 there – Look at your text books as to how equations are handled. When you are discussing an equation, put the equation right after that sentence ends and follow the equation with the definitions of the variables in the equation.
   e. Uncertainty (error) analysis missing—You should not report measured values without indicating the degree of uncertainty in the number.
f. Calibration curves are specific to one set of units: they must be included in the equation—
Equations from physics are valid in any consistent set of units. This is not true of calibration
curves, which have been determined with one set of units and which will only work if you use
those units. Therefore, you must put those units right in the equation.

6. Problems with References:
   a. References missing or incorrect— a citation is needed here: use (author, year) – You must cite
      where you get information from the literature; do not forget to cite prior lab reports if you use
      calibration curves from prior lab reports.
   b. Reference(s) in the list are incompletely cited, e.g. include author, institution, city, etc. – In
      your reference list, follow the common conventions listed on our web site for your references.
      The references must be complete. Use published references (for example your text) over
      unpublished references (for example a professor’s notes).

7. Miscellaneous problems
   a. Follow capitalization rules (note: Fanning, Moody, Reynolds, Bourdon are names) – Do not
      capitalized every noun in a figure caption. You may do this for table captions, but not for figure
      captions. These are not my rules; look at Perry’s – this is their rule too. When you refer to
      Table 1 or Figure 1, you must capitalized those words.
   b. If specific valve, unit numbers (e.g. tank T-01) are mentioned, need P&ID within report – If you
      are going to name a valve, the reader must have the P&ID to see which valve you are talking
      about. The P&ID may not be in the appendix (see appendix rules above) since nothing essential
      should go into the appendix. Put it in as Figure 1.
   c. Avoid extra white space – pay attention to where the tables, figures are placed – Put your
      figures or tables at either the top of a page or at the bottom, never in the middle. Look at your
      report before printing it and make adjustments so that there are not large quantities of white
      space.

8. Violation of “Basics Check List”: errant box, tic marks missing, gridlines, not signed, page # missing, etc.
   – Before printing your report, check it over for Basics Checklist violations. These are minor issues that
   significantly diminish the ability of the reader to have a positive attitude about your report.