WALLA WALLA COLLEGE - SCHOOL OF ENGINEERING

GUIDELINES FOR THE SHORT REPORT

FOREWORD

The short report is suitable for most experimental work done in the educational laboratory. The purpose of the short report is to efficiently communicate the results arrived at by the student to the instructor. (Short reports in industry are used for communication of work done on projects by the engineer to his supervisor.) The term "short report" does not necessarily imply just a few pages (though it usually is), but rather this type of report does not contain all of the features of a formal report such as Table of Contents, Bibliography, etc.

The short report is intended to be concise and to the point. It is, however, not to be lacking in clarity and completeness. Test material is to be typed or lettered in standard engineering form using a pen. Sentences are to be clear and concise. The report is to have a neat professional appearance.

All short reports are to have a "Highlights" page as described below followed by discussions, graphs, calculations, etc., as are specified for by the itemized requirements listed in the particular experiment instructions handed out during the course. Each item following the Highlights page is to bear an appropriate identifying caption corresponding to the particular item and is to be placed in the report in the same order as called for in the experiment instruction sheet. The laboratory data sheet is to be the last item.

THE HIGHLIGHTS PAGE

The Highlights page is to contain the title of the report, a synopsis and results and conclusions. The Highlights page should stand along meaning that the reader does not have to refer to the rest of the report to determine what is important. A sample short report is attached for further study.

Under the caption "Synopsis," the problem and/or nature of the study is to be presented. The exact purpose or objective of the experiment is to be stated. Background materials necessary to understand or orient the reader to the report and investigation may be included but should be held to a minimum.

Under the caption, "Results and Conclusions," short, pointed statements about the results, conclusions, and significance of the laboratory study are to be presented. Short tabulations along with concise remarks about the data are suitable. The Results and Conclusions section should supply information showing how the objective was met (or not met in the event of negative results.) In the case of negative results, the significance of such are to be made clear. If appropriate, recommendations by the report writer may be placed as the last part of this section.

It is not to be construed that the Highlights page is limited to one page though it will usually not exceed a page in length. If the results and conclusions require more than one page then continue them on succeeding pages as necessary.

An example short report follows:

WALLA WALLA COLLEGE
SCHOOL OF ENGINEERING

SHORT REPORT HIGHLIGHTS
COURSE: CIRCUIT ANALYSIS I

TITLE: THE VOLT-AMPERE CHARACTERISTICS OF AN INCANDESCENT BULB AND DETERMINATION OF THE CURRENT IN A SERIES CIRCUIT CONTAINING AN INCANDESCENT BULB.

SYNOPSIS:

An experimental investigation of the properties of an incandescent bulb in a series circuit was made. Specifically it was desired to determine if Ohm's law is a valid approach to solving for current in circuits containing incandescent bulbs.

The following tests were performed in the laboratory:

1. The volt-ampere characteristic of a 100 watt incandescent light bulb was obtained by measuring current for voltages ranging from 0 to 125 volts.

2. The light bulb was connected in a series with a known voltage source and known resistor and current was measured.

From the data bulb resistance was calculated for each test condition.

RESULTS AND CONCLUSIONS:

1. It was found that the resistance of the incandescent bulb is not constant but depends on the voltage across the bulb. Such a resistance is termed non-linear.

2. Because the resistance of the bulb is a function of current (or voltage) Ohm's law cannot be directly used to solve for currents in circuits where non-linear elements are present. However, a graphical approach utilizing the Volt-Ampere characteristics of the bulb can be used to accurately determine what the bulb current or voltage across the bulb will be.

NAME: Could B. You

DATE June 3, 1979

DETERMINATION OF RESISTANCE AND POWER OF BULB RATED AT 100 WATTS AT RATED VOLTAGE

At the rated voltage of 120 volts the current was 0.791 amperes.

$$R = V/I = 1.20 / 0.791 = 152 \text{ ohms}$$

$$P = VI = (120)\ (0.791) = 94.9 \text{ watts}$$

It is noted that this bulb does not give rated watts at rated voltage.

DETERMINATION OF CURRENT IN A SERIES CIRCUIT COMPOSED OF A VOLTAGE SOURCE, RESISTOR AND INCANDESCENT BULB

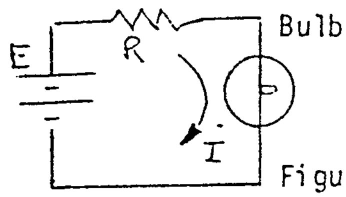
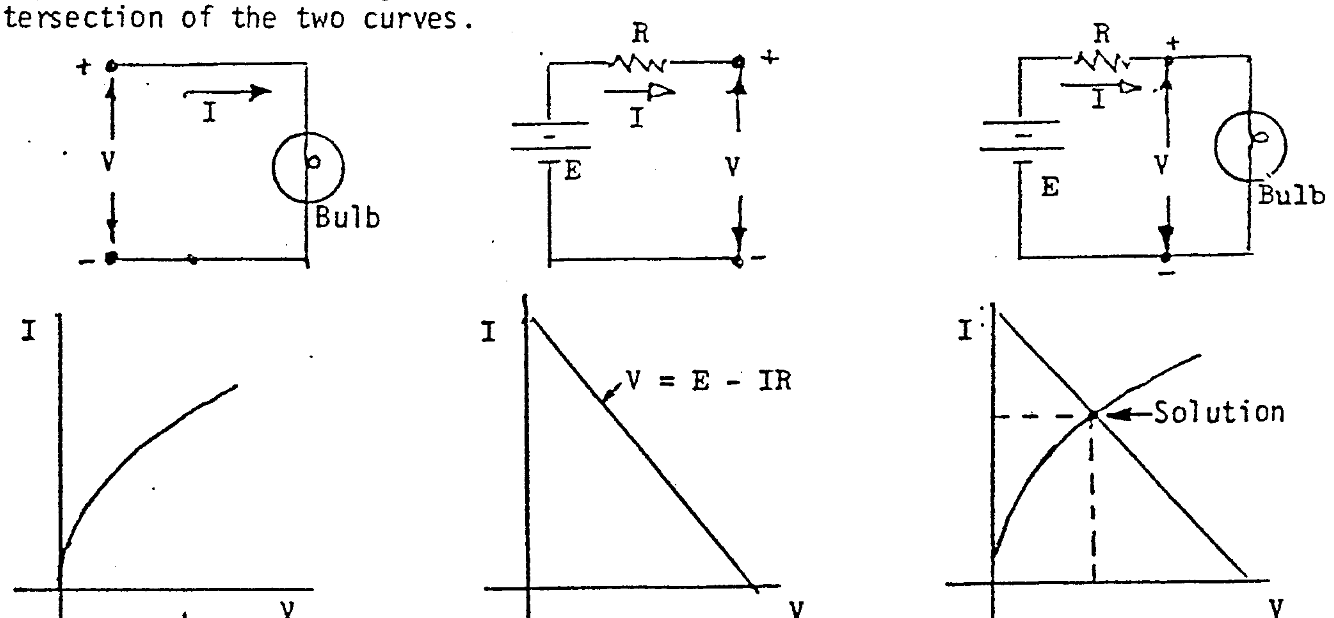


Figure 1

It is desired to find the current I in the series circuit shown in Figure 1. E and R are known and the volt-ampere (V-I) characteristic of the bulb is available.

As a first approach one may try Ohm's law and the fact that resistances in series may be added to obtain an equivalent single resistance. Thus if R_B is the bulb resistance $I = E/(R + R_B)$. It will be recognized that this approach is useless since R_B is not known and cannot be determined until I is known or the voltage across the bulb is known.

The following procedure using a graphical technique will yield the answer. Figure 2(a) shows the V-I characteristic for the bulb. Figure 2(b) is a plot of the V-I characteristic for the source and resistance and is obtained from Kirchoff's voltage law. When the bulb is connected to the terminals of the source, the voltage across the bulb is equal to the voltage across the source terminals. Also the current in both parts is the same. Hence, if the two V-I characteristic are plotted on the same graph as indicated in Figure 2(c), the current in the circuit is obtained from the intersection of the two curves.



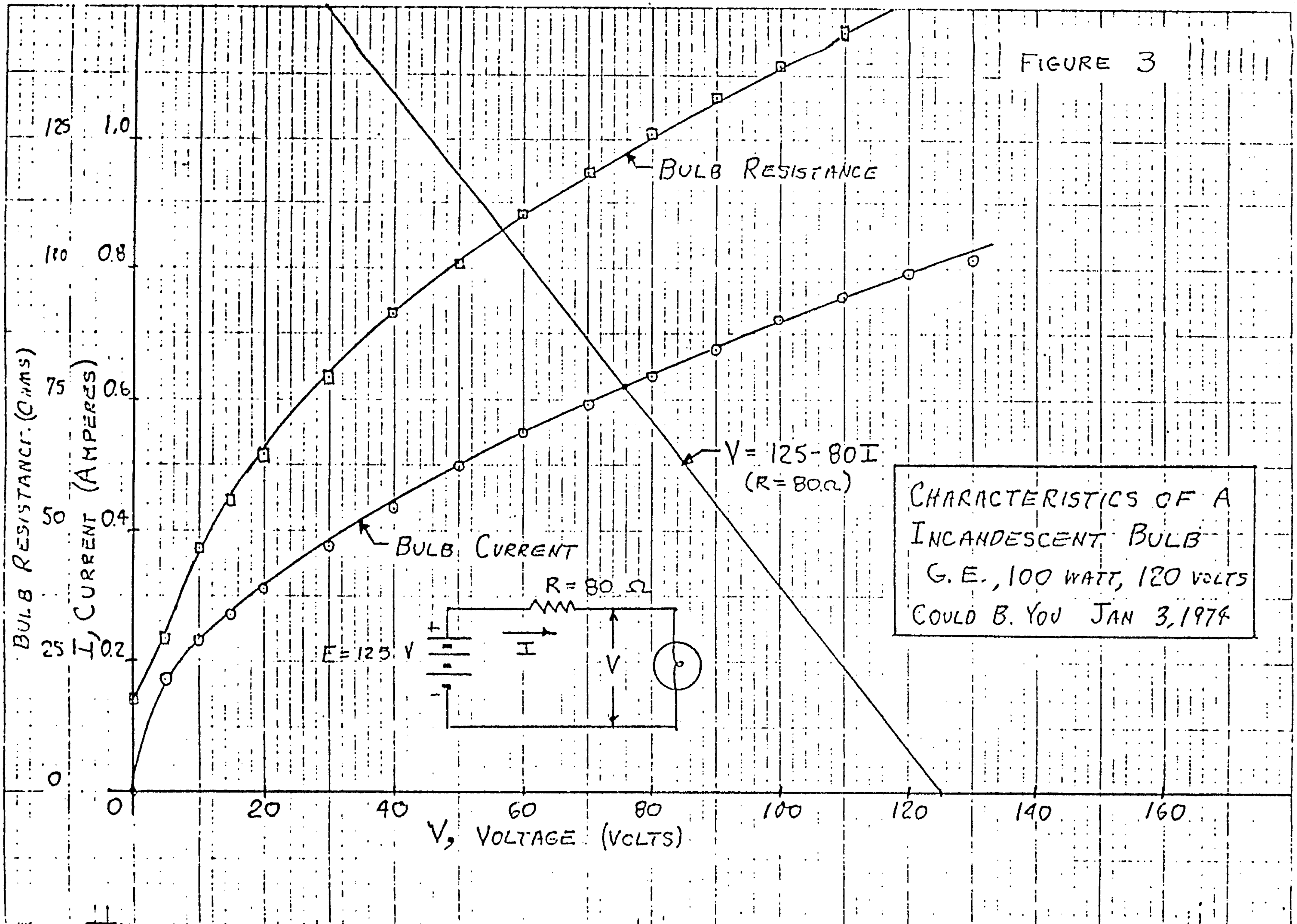
a) V-I curve for bulb

b) V-I curve for source and resistor

c) Solution for current in a series of circuit composed of source, resistor and bulb

Figure 2. Solution For Current in a Non-linear circuit

The V-I characteristic for voltage source of 125 volts and resistor of 80 ohms is plotted on Figure 3. The intersection gives a current of 0.62 amperes which closely agrees with the experimental value of 0.615 amperes.



CHARACTERISTICS OF A INCANDESCENT BULB
G. E., 100 WATT, 120 VOLTS
COULD B. YOU JAN 3, 1974

ENGINEERING LABORATORIES DATA SHEET

WALLA WALLA COLLEGE

TITLE Testing of an Incandescent Bulb NO. 1

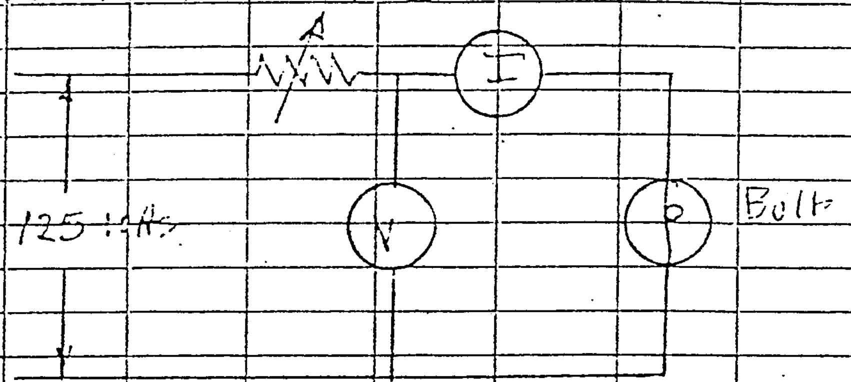
RECORDED BY Could B. You DATE June 2, 1979

Test No 1

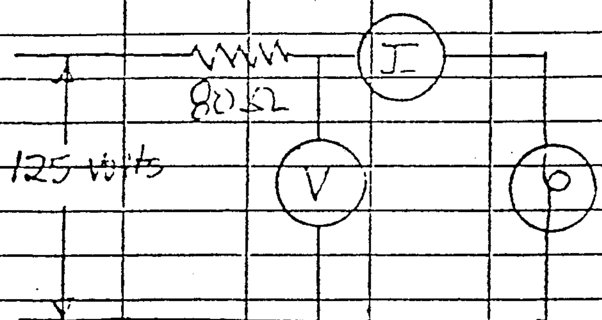
V	I	R*
Volts	amps	ohms
0.0	0.0	—
5.0	0.172	29.1
10.0	0.23	43.5
15.0	0.27	55.6
20.0	0.31	64.5
30.0	0.379	79.4
40.0	0.438	91.3
50.0	0.449	111.4
60.0	0.547	110.0
70.0	0.592	118.
80.0	0.635	126.
90.0	0.677	133.
100.0	0.720	139.
110.0	0.755	146.
120.0	0.791	152.
125.0	0.810	154.

* R calculated using R = V/I

← Light became visible (at 15.0 volts)



Test No. 2



V = 74 volts
I = 0.615 amperes } MEASURED

MAKE, NO., CAPACITY, AND DESCRIPTION OF APPARATUS TESTED	EXPERIMENT PERFORMED BY
G.E. Light Bulb	Could B. You
100 Watts, 120 Volts	Afriend O. Yours
	Eager I. Learn

Graphs:

1. The graph title needs improvement. The graph title shown is not descriptive, or it is inaccurate, or it is redundant. The title should describe the particular function(s) shown as related to the type of device tested. A title that repeats only the vertical axis title and horizontal axis title hardly tells anything that isn't already told be the axis titles.

2. The origin of the graph is not shown. Not including the origin throws away useful information and reduces the graphical quality of remaining information. For example, the quantities plotted are not proportional to the labeled variables. Also one can't determine if a curve goes through the origin in such a graph and one can't determine the axis intercepts.

3. The scale factor on the coordinate axis should be selected to make reading the scale easy. The scale is a ruler to measure length. The ruler should be calibrated in numbers that make scale reading easy. To illustrate consider a ruler instead of being calibrated so that scale division numbers were 1,2,3,... was calibrated 1.25, 2.50, 3.75,... etc. This would result in a very difficult ruler to use.

4. The graph should contain all information needed to understand the curves. The graph should be able to stand alone without the report and make sense. Graph annotation should include a legend of curves, the specific system tested, values of variables held constant during test, date & your name.

5. Need units on x & y axis.

6. Draw smooth "fitted" curves through experimental points. For linear functions these should be straight lines. Do not show inflections unless the theoretical function has inflections. Data will deviate from the lines due to random or systematic error.

7. Experimentally measured points, particularly data measured discretely are to be plotted as POINT SYMBOLS. Lines indicate function data contained from a formula or an empirical fit to experimental data.

8. The scale of the graph is cluttered with numbers. This makes it difficult to read the numbers associated with tick marks. Scales should be marked with numbers approximately every inch of full page (8.5 x 11 inch size). Use a maximum of 3 significant figures. See note on values in highlight notes.

9. The graph is assembled in the report upside down. The top of the graph should be such that the binding edge of the report is either on the left as you read the graph or at the top of the page for landscape format.

GRADING COMMENTS

The numbered items below correspond to encircled numbers in your report where these comments are applicable.

Highlights Page:

1. The laboratory short report should be typed.

2. Highlights page format different than published format.

3. Nature of test not described. What was adjusted? What was held constant during the tests?

4. Describe the important characteristics of each experiment as a separate item or paragraph.

5. The conclusions are either too shy, not complete or missing. The conclusions should be substantial and addressed to the topic defined by the title of the report. The reader wants useful information about the laboratory experiment performed.

6. This material either refers the reader to the rest of the report to understand it or it requires the reader to read the rest of the report to get the point. The Highlights page is to be capable of "standing alone" meaning it can be read and understood without reading anything more.

7. Information is crowded. Use spaces to spread information especially between paragraphs to make it easier to read.

8. There is a grammar problem here. Use complete sentences in reports. Avoid abbreviations in technical reports.

9. This is an incorrect statement or an unclear statement.

10. Four or five significant figure data are not justified. The preferred method of stating values is to use the prefixes micro, milli, kilo, mega, etc. An alternative method is to use scientific notation.

11. A descriptive caption is needed to head the section and information contained therein. Make the caption descriptive rather than generic. See any book for examples of useful captions. (Note: This applies specifically to sections of the report other than the highlights page.)

12. Please provide a complete set of sample calculations & equations including units. (Hand printing is acceptable)

LABORATORY REPORT CHECKLIST

_____ 1) Are figures in with the top up or toward the left hand side of the report?

_____ 2) Are figure and table numbers in order?

_____ 3) Are units present in the appropriate places in the figures and tables, and are standard unit symbols used?

_____ 4) Are the scale factors chosen appropriately? (Use integer scaling units where possible. Decimal values must have leading zeros. The origin must align with the tic marks.)

_____ 5) Are there captions for the figures?

_____ 6) Is there a schematic diagram clearly defining the quantities measured and displayed in the figures and tables?

_____ 7) Does the abstract stand alone?

_____ 8) Is it distinct from a summary?

_____ 9) Does it contain anything not elaborated in the report?

_____ 10) Do you know what the report is about by reading only the title and abstract?