GUIDELINES FOR WRITING PHYSICS ESSAYS

A scientific essay is different from an essay in the humanities. Apart from the obvious, like the inclusion of diagrams and mathematics, the style differs in that separate ideas or topics are often presented as separate and distinct sections. An abstract, introduction and conclusion are essential.

The following are guidelines to assist in the planning of your essay. It is not absolutely necessary to adhere strictly to all of the recommendations, but you will find that they provide a useful framework on which to base your own writing.

CONTENT

- The material presented should be carefully chosen to match the assumed readership. A good rule is to consider the essay to be aimed at an informed student (not necessarily in Physics) who might want to study the subject at a later date, or someone like a high school science teacher who is reading for general interest.
- Essay writing is an exercise in communication. Therefore only material which the writer thoroughly understands should be included.

- The material chosen should be coherent and complete. To leave readers wanting to know more is to be encouraged; to leave them unable to understand the topic without further reading is wrong.

- Copying the work of another writer into your own work without acknowledgment constitutes plagiarism. **Plagiarism is absolutely unacceptable**. All ideas and phrases which are not your own, including those from lectures and the Web, must be acknowledged. All quoted material must be enclosed in quotation marks or indented and it must be repeated exactly in the form of the original. Any omission from, or variation to, the original, must be identified by a standard typographical device, e.g. ellipsis dots, italics or square brackets. Quoted material must be acknowledged by a standard form of reference including the page number on which the material is to be found. Paraphrased material or ideas taken from the work of any other writer, including fellow students, must also be acknowledged in the same way as directly quoted material.

- Elegance of style should not be avoided, but it is not as important as clarity. But even if your style is pedestrian, you can still make sure that your spelling and grammar are correct. The *Oxford English Dictionary* is the most widely accepted reference for spelling.

- An impersonal style for scientific writing is so widely accepted as to be considered almost mandatory. For more general considerations consult a style manual such as the the *American Journal of Physics Style Manual* (Physics Reference R 530.149 1B).

- Care should be taken to achieve a balance between the need to use correct nomenclature, and the advisability of avoiding jargon. Always keep in mind the readers for whom the essay is intended.

- Mathematical equations, graphs and diagrams are means of conveying a lot of information in highly condensed form. They should be used with care. Graphs and diagrams should be accompanied by a caption and a figure number, and positioned in the text where they are referred to. Equations should be considered as part of the text, punctuated like any other sentence and numbered if they are referred to again.

LAYOUT

- Any scientific writing usually needs more than one reading to be thoroughly understood, and it is important that different parts of the essay can be read with different degrees of concentration on different readings. So the body of the text should be subdivided into sections, with appropriate headings. In particular there should be an introduction and a conclusion, and it should be possible to get a fair idea of the whole essay from reading only these two.

- Very few scientific articles are published without severe restrictions on word length. Therefore your essay should differ from the quoted length by no more than about 25%.

- Most scientific articles can expect to be referenced in collections of abstracts and citation indices. Therefore your essay should have a short abstract on the title page, with an absolute upper limit of 50 words.

- References within the text of a scientific article must conform with the editorial policy of the journal in which it is published. The most usual conventions are either by means of number markings in the text, thus[1]; or the author's name and date of publication in parantheses (SMITH, 1986).

- A list of references is essential. Unlike some other subject areas, it would not be usual to include a reading list (a bibliography) which contained books or papers not actually referenced in the text. Different journals adopt different formats for references. The standard form adopted by the American Institute of Physics for references is:
    - R. Resnick, *Introduction to Special Relativity*, (Wiley N.Y., 1968), pp 77-83.
    - M.L.Boas, *Amer. J. Phys.*, **29**, 283, (1961).

  If you don't have access to a printer which can handle italic and boldface fonts, the name of the book or journal and volume number should be underlined.

- If there is some very detailed piece of mathematics, or description of equipment, that you feel cannot be left out, it should be put in an appendix.