

Donald P. Shiley School of Engineering
EGR 221 Materials Science
Assignment 1, Fall 2015

Be sure to always use the standard ME homework format

(<http://faculty.up.edu/lulay/MEStudentPage/HomeworkFormat.pdf>)

For “essay” type questions (such as definitions), it must be clear what question you were asked.

For example, here is the format appropriate for essay (non-calculation) type questions:

Define the following Latin and/or Greek prefixes, suffixes and terms.

homo

Latin origin meaning: *human beings, mankind*; literally, “man”; however, it now generally also includes, “woman” or “women”. As in: *homo sapiens* is the scientific name for humans.

Also in Greek:

Greek origin meaning: *same, equal, like, similar, common; one and the same*. As in *homogenized* milk.

REF: http://wordinfo.info/words/index/info/search_box/index.

Assignment 1:

- 1) The following are often used as prefixes or suffixes in technical vocabulary in medicine, physics, engineering, etc. For each of these, determine the origin (Latin or Greek), “translate” it into English, and use it in an English word.

Provide descriptions/answers similar to the example above for the following:

Homo, hetero, poly, iso, trop, plast, morph, hyper, hypo, meta, eu, pro, pre, oid, ic, ous, ite

You may use the same link I referenced above, or other sources, but you **MUST** cite your sources (like I have).

- 2) Define/describe atomic weight and atomic mass. Cite your reference (if you use the textbook, you may simply cite “textbook, pg. x).
- 3) What is the difference between “primary” bonds and “secondary” bonds?
- 4) Define/describe including sketches, the following bonds: ionic, covalent, metallic, van der Waals.
- 5) *Being able to convert between units properly is an essential engineering skill!* Using only the fact that $13.1 \text{ sm} = 1 \text{ kf}$, and $4 \text{ sm} = 3 \text{ hm}$, how many square kf’s are in one square hm?
- 6) *Units can be our friend. Including units every step of an analysis can quickly show us if we are on the right or wrong path!* Using units, show that $E=mc^3$ must be false and $E=mc^2$ may be true.
- 7) *Your knowledge of unit prefixes is very important!*
 - a) How many mm in 1 cm?
 - b) How many mm in 1 m?
 - c) How many lb/in^2 in 1 ksi (aka 1 kpsi)?
 - d) How many Pascal’s in 1 MPa?
 - e) How many Pascal’s in 1 GPa?