

Homework exercises for the 2nd Year

- I: Find definitions for electron shell, sub-shell and orbital.

II: For the element selenium: (a) Sketch a \log_{10} ionisation energy graph.
(b) Write the electronic structure in s,p,d,f-notation.
(c) Repeat (b) using electrons-in-boxes notation.
- I: Find definitions for ionic, covalent and dative bonding.

II: Draw dot/cross diagrams for: (i) Ca_3N_2 ; (ii) OBr_2 ; (iii) NH_4^+I .
- I: What are the differences between polar and non-polar molecules?

II: State if the following molecules are polar or non-polar, and what intermolecular forces they have between molecules: (i) H_2S ; (ii) CO_2 ; (iii) HF .
- I: Find out what substances have the highest melting and boiling points. What structures do they have?

II: What structure do the following substances have?
(i) silicon; (ii) phosphorus trichloride; (iii) platinum; (iv) barium oxide.
- I: Find out the trend in density going across period 2 of the periodic table. How is this linked to the structures of these elements?

II: Put the following elements in order of their boiling points:
(i) aluminium; (ii) chlorine; (iii) sodium; (iv) silicon.