

1. To draw a Lewis structure for a molecule, there are certain rules you need to follow. These rules are given here in a very simple form:

- i. Draw the Lewis dot symbols for the atoms and decide how many bonds each one should make to achieve an octet (except for hydrogen, which can only make a “duet”).
- ii. Place the atom that needs the most bonds in a central position and surround it by the other atoms.
- iii. Make single bonds between the central atom and the surrounding atoms.
- iv. Put the remaining electrons (dots) around the atoms so that as many of the atoms have octets.
- v. Place double or triple bonds if they will increase the number of atoms in the structure that have octets; this may involve switching lone pair into a bonding pair.
- vi. Check your structure to ensure no atom has more than 8 electrons (or 2 for hydrogen).

Using these rules, draw Lewis structures for the following molecules:

- a. SeCl_2
- b. AsH_3
- c. OF_2
- d. SiF_4
- e. HCN

2. Calculate the wavelength (λ) and the energy (E) of a single photon of each of the following frequencies (ν) of electromagnetic radiation:

- | | |
|-----------------------------------|----------------------------------|
| a. 100.2 MHz (FM radio broadcast) | b. 1070 kHz (AM radio broadcast) |
| c. 835.6 MHz (cell phone band) | d. 5 EHz (exa = 10^{18}) |

Use the following values in your calculations:

$$c = 3.0 \times 10^8 \text{ m/s}$$
$$h = 6.626 \times 10^{-34} \text{ J}\cdot\text{s}$$