Unit 1 Review

1. H_2O — no

2. group 1 alkali metals
   2 alkaline earth metals
   17 halogens
   18 noble gases
   3-12 transition metals

   lanthanides
   actinides

3. see your notes. (summary chart)

4. Mendeleev - by atomic #

5. atomic # → # of protons in the nucleus
   atomic mass → not a whole # because it is a weighted average of all the isotopes of that element

6. Cl-37
   #n = 37-17 = 20 mass # = 37 atomic # = 17 #e = 17

7. AR ↓ inc
   - increases down a group because you are adding energy levels
   - dec across (L to R) a period because ↑ nuclear charge - more protons in the nucleus that can better attract in the é ∴ smaller radius

8. IE ↑ inc → the energy needed to remove an é
   the larger you are the easier to remove an é
   ∴ smaller IE
   the smaller the higher the IE é is harder to remove

EA EN ↑ inc → the smaller you are the easier to attract in an é

- EA → energy released when gaining an e
- EN → ability of an atom to attract an é (when forming bonds)

* you will need to be more specific than this

9. $\cdot\ddot{O}:$ $\quad Al\cdot$ $\quad Na\cdot$ $\quad \cdot\ddot{I}:$ $\quad :\ddot{X}e:$

$[:\ddot{O}:]^{2-}$ $\quad [Al]^{3+}$ $\quad [Na]^{+}$ $\quad [:\ddot{I}:]^{-}$ $\quad$ no ion (for our course)

10. a) CO_2 - covalent $\quad$ c) $FeCl_2$ - ionic $\quad$ e) Al_2SO_3 - ionic

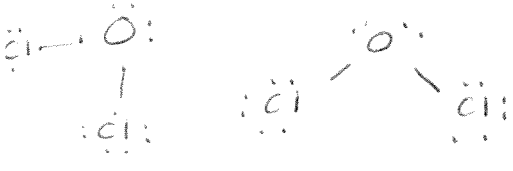
b) NaCl - ionic $\quad$ d) CCl_4 - covalent

11. $3\,Mg\cdot \rightarrow 3[Mg]^{2+} + \cancel{2}^{6}e^{-}$

$2\cdot\ddot{P}\cdot + \cancel{3}^{6}e^{-} \rightarrow 2[:\ddot{P}:]^{3-}$

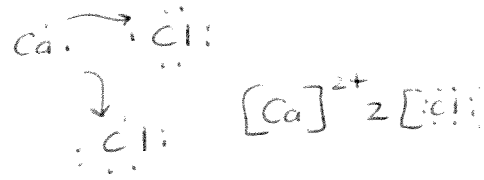
$3\,Mg\cdot + 2\cdot\ddot{P}\cdot \rightarrow 3[Mg]^{2+}\ 2[:\ddot{P}:]^{3-}$

12. O & Cl
covalent



P & H
covalent

Ca & Cl
ionic



N & N covalent

$:N\equiv N:$

13. refer to chart in your notes

*crystal lattice

14. H_2

$\Delta EN = 0$

pure covalent

CH_4

$\Delta EN = 2.55 - 2.20$

$= 0.35$

slightly polar covalent

LiF

$\Delta EN = 3.98 - 0.98$

$= 3$

ionic

H_2O

$\Delta EN = 3.44 - 2.20$

$= 1.24$

polar covalent

15. $H^{1+}\ Cl^{1-}$ $Na^{1+}\ O^{2-}$ $P^{3+}\ Cl^{1-}$ $Al^{3+}\ O^{2-}$ $Mg^{2+}\ O^{2-}$

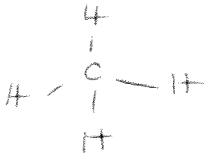
HCl Na_2O PCl_3 Al_2O_3 MgO

16. linear $H-H$

bent

pyramidal

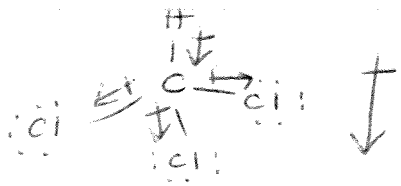
tetrahedral



17. polar molecule has a slightly positive end ↔ a slightly negative end ∴ overall dipole

18.

polar



polar

polar

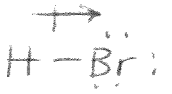
19. intermolecular forces are <u>between</u> molecules
Intramolecular forces are between atoms within a molecule.

20. dipole-dipole
dipole-ion
hydrogen bonding
london dispersion

21.

polar hydrogen bonding & london dispersion forces

HB > DDF > LDF



polar dipole-dipole forces and london dispersion forces

NH_3 would have the higher melting point because hydrogen bonding is a stronger force than dipole-dipole