1. Probably not, it's water (H_2O)
2. SATP (standard ambient temperature & pressure: 25°C, 100 kPa),

STP (standard T&P: 0°C, 101.325 kPa)

Element: cannot be broken down by chemical means (all same type of atom). Compound: broken down by chemical means (two or more different types of atoms)

Group: vertical column on periodic table

Period: horizontal (left/right) row

Metal: element to the left of the staircase line. They tend to be solids at SATP, and conduct.

Nonmetals: to the right of staricase line. Tend to be gases, non-conductors, and brittle as solid

3. I - Alkali metals, II - Alkaline earth metals, VII - halogens, VIII - noble gasses, middle - transition elements/metals, bottom - inner transition elements (lanthanides, actinides)
4. Democritus: first to propose atom and the void based purely on logic

Aristotle: his ideas were also based on thought. He was way off, but his ideas persisted for 2000 years

Dalton: 1st to investigate structure of matter by experiment. His five postulates included the idea that all matter is made of atoms, each element has its own type of atoms, and atoms are rearranged in chemical reactions

Thompson: with the identification of electrons he proposed that negative electrons existed in a positive dough.

Rutherford: famous gold foil experiment proved that an atom was mostly empty, with a dense positive nucleus orbited by electrons

Bohr: added to Rutherford's model the idea of "shells". Evidence includes line spectra.

5. Mendeleev ordered table according to atomic mass (today it's done by atomic number)
6. Atomic number = # of protons

   Mass number = # or protons + # of neutrons

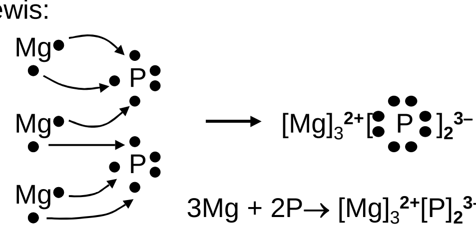
   They are averages (of different isotopes)
7. 20, 37, 17, 17
8. Size increases down a group (more shells), it decreases left to right as the # of protons increases, pulling outer electrons closer
9. Ionization energy: energy required to remove outer electron. It is high when atoms are small (high in group) with lots of protons (right in period). Electron affinity: the energy change when an electron adds to an atom. It is also high when atoms are small (high in group) with lots of protons (right in period).

Electronegativity: ability of atoms, when bonded, to attract electrons (essentially a numerical value for electron affinity). It follows the same trend as electron affinity for the same reason

10.

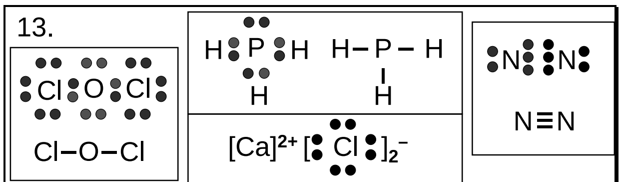
Ions:	O^{2-}	Al^{3+}	Na^{+}	I^{-}	no ion
Valence:	2	3	1	1	n/a

11. Covalent = a, d   Ionic = b, c, e
12. Lewis:



$3Mg + 2P \rightarrow [Mg]_3^{2+}[P]_2^{3-}$

13.



14. Ionic: high melting/boiling points, soluble in polar solvents, conducts when dissolved in water but not as solid, brittle.

    Covalent: low melting/boiling points, soluble in non-polar solvents, doesn't conduct, soft.

These differences are caused by the different strength of intermolecular forces in ionic versus covalent molecules.

15. In order from low to high boiling points: H_2: covalent (ΔEN=0), CH_4: covalent (0.4), H_2O: polar covalent (1.4), LiF: ionic (3.0)
16. HCl, Na_2O, PCl_3, Al_2O_3, MgO
17. A) copper(I) iodide, b) HI(aq), c) dinitrogen tetroxide, d) phosphorous acid, e) PBr_5, f) Fe_2O_3, g) K_3N, h) $H_2C_2O_4$, i) dichlorine heptoxide, j) hydrofluoric acid, k) nickel (II) sulfate hexahydrate, l) hydrogen sulfide
18. combustion: AB + oxygen → oxides of A & B

synthesis: A+B→C, decomposition: AB → A + B

single displacement: A + BC → AC + B

double displacement: AB + CD → AD + CB

a) S, b) DD, c) S, d) D, e) SD, f) DD, g) S, h) SD

19. a) $Ca + CuSO_4 \rightarrow Cu + CaSO_4$

    b) $FeCl_2 + Ag \rightarrow$ NR

    c) $H_2O + Ca \rightarrow H_2 + Ca(OH)_2$

    d) $Al + H_2SO_4 \rightarrow H_2 + Al_2(SO_4)_3$

    e) $Na + Ni_3(PO_4)_2 \rightarrow Ni + Na_3PO_4$

    f) $Au + HCl \rightarrow$ NR