

1)

Particle	Relative Mass	Relative Charge
Proton	1	+1
Neutron	1	0
Electron	~ 0	-1

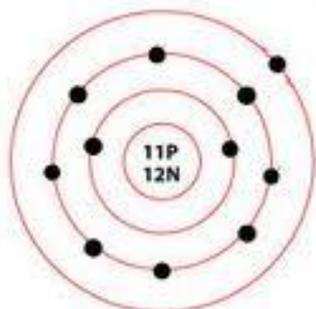
2) 2+ 3) 2-

4)

Element	Symbol	Z	A	Protons	Neutrons	Electrons
sodium	Na	11	23	11	12	11
carbon	C	6	12	6	6	6
magnesium	Mg	12	24	12	12	12
Polonium	Po	84	209	84	125	84
chlorine	Cl	17	35	17	18	17
chlorine	Cl	17	37	17	20	17

5) Isotopes are atoms of the same element so have the same number of protons but they have different mass numbers so different numbers of neutrons.

6) $((16 \times 40) + (3 \times 39)) / 19 = 39.84$ (2 dp)

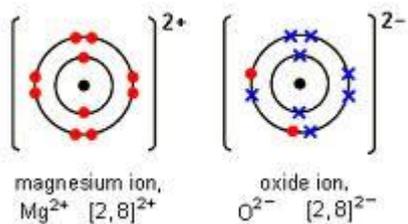


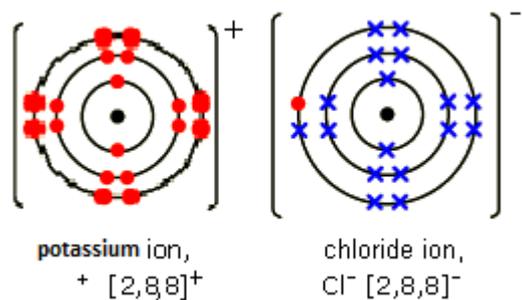
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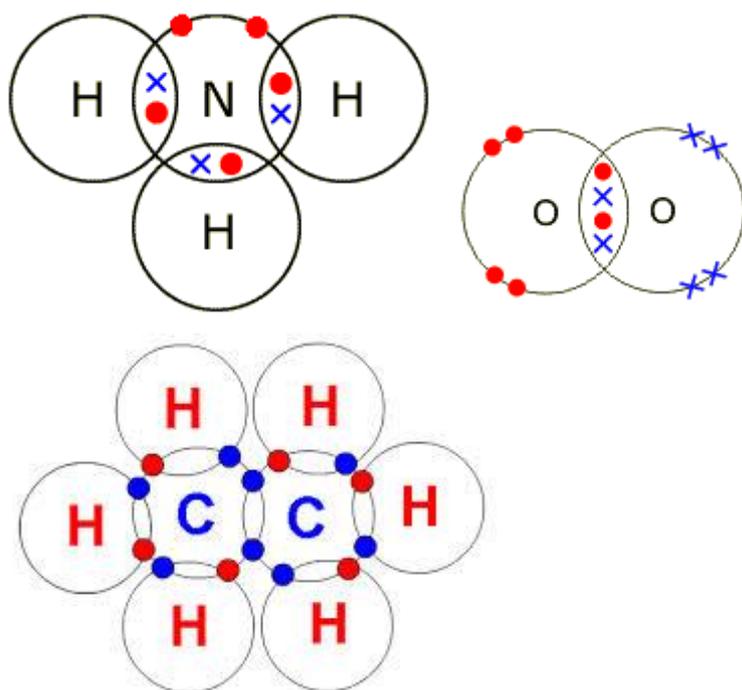
S	P
caesium	phosphorus
potassium	aluminium
calcium	lead
barium	sulphur

9)





10)



11)

Aluminium	3+
Barium	2+
Rubidium	+
Phosphorus	3-
Bromine	-
Sulfur	2-
Strontium	2+

12)

Name	Molecular Formula	Displayed or Structural Formula	Boiling Point (oC)
Methane	CH ₄	CH ₄	-162
Ethane	C ₂ H ₆	CH ₃ CH ₃	-89
Propane	C ₃ H ₈	CH ₃ CH ₂ CH ₃	-42
Butane	C ₄ H ₁₀	CH ₃ CH ₂ CH ₂ CH ₃	0
Pentane	C ₅ H ₁₂	CH ₃ CH ₂ CH ₂ CH ₂ CH ₃	36

13) As chain length increases the boiling point increases.

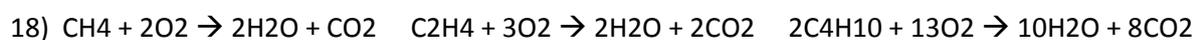
14) This is because longer molecules have more electrons so there is a larger intermolecular (Van der Waals) force of attraction between longer molecules which requires more energy to break.

15)

Structure	Examples	General Properties
Ionic	NaCl MgO KBr LiF	High melting point, crystalline solids that dissolve in water and conduct electricity only when molten or in aqueous solution.
Simple Covalent	CO ₂ H ₂ O CH ₄ N ₂ O ₂	Low melting point gases or liquids that sometimes dissolve in water but often do not and do not conduct electricity.
Giant Covalent	SiO ₂ graphite diamond	High melting point solids that usually do not dissolve in water or conduct electricity except graphite.
Metallic	Mg Fe K Pb	High melting point solids except mercury that conduct electricity well and do not dissolve in water

16) Boiling point

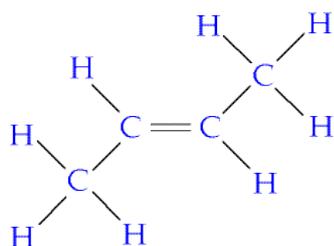
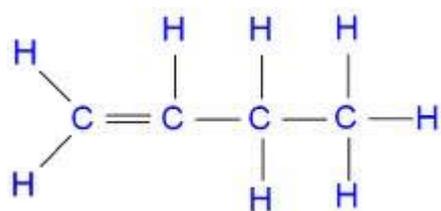
17) The longer the chain the higher the condensation temperature.

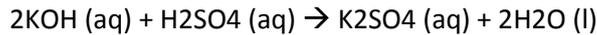
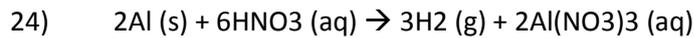
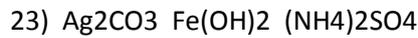
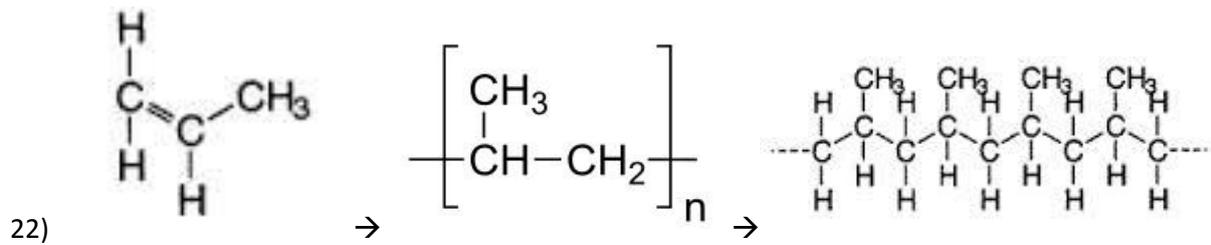


19) $\text{C}_n\text{H}_{2n+2}$

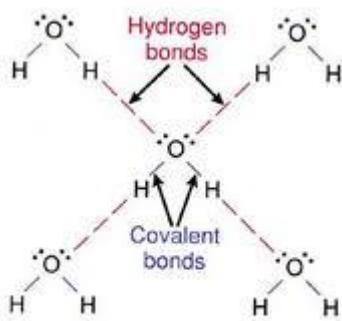
20) Carbon monoxide, carbon and water

21) But-1-ene has the double bond starting on the first carbon in the chain and in but-2-ene it starts on the second carbon.





27) Water is considerably less dense than ice and this unusual property is considered to be due to the hydrogen bonding in water. In ice, the 4 hydrogen bonds per molecule hold the water molecules apart in an open lattice structure. When the ice melts, the rigid hydrogen bonds break and the water molecules come closer together, now forming 2 hydrogen bonds per molecule, making it denser than ice. A hydrogen bond is the strongest of the intermolecular forces and forms between atoms of the electronegative F, O or N and hydrogen. It takes more energy to disrupt these forces so water has a higher boiling point than would be expected of a Group 6 hydride.



Hydrogen bonding in water.