



A few exercises on the structure of the atom - Correction

For each of these sentences, tell if it's true or false. Justify your answer.

1. False. The nucleus is a part of an atom. Therefore, it cannot have the same diameter.
2. False. There are no different types of electrons.
3. False. The nucleus of an atom contains neutrons and protons, and no electrons.
4. False. Gases are made of atoms or molecules. Therefore, there cannot be atoms inside atoms.
5. False. A neutron is neutral. It has no charge.
6. False. A nucleon is either a proton or a neutron.

Complete the following table

Gallium: 31 protons => 31 electrons
 31 protons + 38 neutrons = 69 nucleons

Einsteinium: 99 protons => 99 electrons
 252 nucleons – 99 protons = 153 neutrons

Yttrium: 89 nucleons – 50 neutrons = 39 protons => 39 electrons

Ruthénium: 44 electrons => 44 protons
 44 protons + 58 neutrons = 102 nucleons

Magnesium chlorine

1. Magnesium: $Z = 12 \Rightarrow 12$ protons $\Rightarrow 12$ electrons
 $A = 24 \Rightarrow N = A - Z = 24 - 12 = 12$ neutrons
 Chlorine: $Z = 17 \Rightarrow 17$ protons $\Rightarrow 17$ electrons
 $A = 35 \Rightarrow N = A - Z = 35 - 17 = 18$ neutrons.
2. $m_{Mg} = A_{Mg} \times m_{nucl} = 24 \times 1.67 \times 10^{-27} = 4.01 \times 10^{-26} \text{ kg}$
3. $m_{Cl} = A_{Cl} \times m_{nucl} = 35 \times 1.67 \times 10^{-27} = 5.85 \times 10^{-26} \text{ kg}$
- 4.

	Reality	Model
Nucleus	$10 \times 10^{-15} \text{ m}$	1.5 cm
Atom	$300 \times 10^{-12} \text{ m}$	$d_{model} = d_{grape} \times \frac{d_{atom}}{d_{nucleus}}$ $= 1.5 \times \frac{300 \times 10^{-12}}{10 \times 10^{-15}}$ $= 4.5 \times 10^5 \text{ cm} = 4.5 \times 10^2 \text{ m}$