

Intro to Chemistry I

Deduce the number of protons, neutrons and electrons in the following species:

1. ${}^1_1\text{H}$
2. ${}^{17}_8\text{O}$
3. ${}^4_2\text{He}^{2+}$
4. ${}^{132}_{54}\text{Xe}$
5. ${}^{27}_{13}\text{Al}^{3+}$
6. ${}^{235}_{92}\text{U}$
7. ${}^1_1\text{H}^+$
8. ${}^{45}_{21}\text{Sc}^{3+}$
9. ${}^{37}_{17}\text{Cl}^-$
10. ${}^{14}_6\text{C}$

11.. Bromine has two isotopes, with mass numbers 79 and 81. Its relative atomic mass is often given as 80. What does that tell you about the relative abundance of the two isotopes?

Write the electronic configuration of the following using the orbital method:

1. N^{3-}
2. Ar
3. Sc^{3+}
7. Mn^{2+}
8. Fe^{3+}
9. V^{3+}

1. Why does the first ionisation energy of atoms generally increase across a period?
2. Why is the first ionisation energy of boron less than that of beryllium?
3. Why is the first ionisation energy of oxygen less than that of nitrogen?
4. Why do first ionisation energies decrease down a group?

5. Why does helium have the highest first ionisation energy of all the elements?
6. Why is the second ionisation energy of an atom always greater than the first?
7. Why is the second ionisation energy of sodium much greater than the first?
8. Why does atomic size decrease across a period?
9. Why does atomic size increase down a group?
10. Why are cations always smaller than the corresponding atoms?
11. Why are anions always larger than the corresponding atoms?