

Revised August 2005



AP WORKED ANSWERS

1997, 6

Points 2, 2, 2, 2

(a) Potassium has an extra shell of electrons and therefore greater shielding when compared to Lithium. Despite the extra protons (nuclear charge) in Potassium, shielding is the dominant factor. In addition its outermost electrons are further away from the nucleus and in a higher energy level. As a result they are more easily removed, i.e. there they have a lower ionization energy.

(b) N^{3-} and O^{2-} are isoelectronic, but N^{3-} has one less proton, therefore pulling the electron cloud in to a lesser extent, making it larger than the oxide ion.

(c) Both Zinc and Calcium have outermost electrons in a 4s orbital but Zinc has ten extra protons. This extra nuclear charge attracts the electron cloud more making Zinc smaller.

(d) The 2p outer electron in is in a slightly higher energy orbital than the 2s, and is being shielded by a full 2s orbital giving it a slightly lower ionization energy than expected.