

Chemguide – answers

ELECTRONIC STRUCTURES OF IONS

You will need a copy of the Periodic Table for these questions.

1. a) $1s^2$
b) $1s^2 2s^2 2p_x^2 2p_y^2 2p_z^2 3s^2 3p_x^2 3p_y^2 3p_z^2$
c) $1s^2 2s^2 2p_x^2 2p_y^2 2p_z^2$
d) $1s^2 2s^2 2p_x^2 2p_y^2 2p_z^2 3s^2 3p_x^2 3p_y^2 3p_z^2$
e) $1s^2 2s^2 2p_x^2 2p_y^2 2p_z^2$
f) $1s^2 2s^2 2p_x^2 2p_y^2 2p_z^2$
g) $1s^2 2s^2 2p_x^2 2p_y^2 2p_z^2$
h) $1s^2 2s^2 2p_x^2 2p_y^2 2p_z^2 3s^2 3p_x^2 3p_y^2 3p_z^2$
i) $1s^2 2s^2 2p_x^2 2p_y^2 2p_z^2$
j) $1s^2 2s^2 2p_x^2 2p_y^2 2p_z^2$
2. a) $[\text{Ar}] 3d^3$
b) $[\text{Ar}] 3d^7$
c) $[\text{Ar}] 3d^5$
d) $[\text{Ar}] 3d^8$
e) $[\text{Ar}] 3d^9$
3. a) $4s^2 4p_x^2 4p_y^2 4p_z^2$
b) $6s^2$
c) $5s^2 5p_x^2 5p_y^2 5p_z^2$
d) $4s^2 4p_x^2 4p_y^2 4p_z^2$
e) $4s^2 4p_x^2 4p_y^2 4p_z^2 4d^{10}$ (I know it is inconsistent not showing all the d-orbitals separately, if we are going to show the separate p-orbitals – but that's what tends to happen. In fact, in these examples, we would normally lump all the p-electrons together as, for example, $4p^6$, but I am just trying to make you work as hard as possible!)

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4. The easiest way of doing these is probably just to count the electrons and compare that with the atomic number. Too few electrons means that you have a positive ion; too many a negative ion.
- a) Xe
 - b) Te^{2-}
 - c) Sn^{2+}