

## Chemguide – questions

### ELECTRONIC STRUCTURES OF ATOMS

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

- Write down the electronic structures of the following atoms, showing all the orbitals separately. For example, calcium would be given as  $1s^2 2s^2 2p_x^2 2p_y^2 2p_z^2 3s^2 3p_x^2 3p_y^2 3p_z^2 4s^2$ .
  - boron
  - chlorine
  - nitrogen
  - helium
  - silicon
  - potassium
  - sodium
  - aluminium
  - sulphur
  - oxygen
- Write down the electronic structures of the following d block elements. To save time, you can use the notation [Ar] to represent the electronic structure of argon, so that iron would be [Ar]  $3d^6 4s^2$ .
  - titanium
  - cobalt
  - chromium
  - nickel
  - copper
- Write down the outer electronic structures of the following atoms. In each case, you need only show the electrons in the s and p (if relevant) orbitals in the outermost energy level. For example, xenon would be  $5s^2 5p_x^2 5p_y^2 5p_z^2$ .
  - caesium (atomic number: 55)
  - tin (atomic number: 50)
  - astatine (atomic number: 85)
  - tellurium (atomic number: 52)
  - radium (atomic number: 88)
  - barium (atomic number: 56) – but in this case give the full electronic structure. You can condense inner p or d electrons as  $p^6$  or  $d^{10}$ .
- Which atoms have the following electronic structures?
  - $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p^6 4d^{10} 5s^2 5p_x^1 5p_y^1 5p_z^1$
  - $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10} 4s^2 4p_x^2 4p_y^1 4p_z^1$