

**Tutorial****Question 15.**

a) Iron has 26 proton number. Write the electronic configuration of iron, iron(II) ion and iron(III) ion.

Fe: **1s 2s 2p 3s 3p 4s 3d**

Fe<sup>2+</sup>: **1s 2s 2p 3s 3p 4s 3d**

Fe<sup>3+</sup>: **1s 2s 2p 3s 3p 4s 3d**

b) How many valence e<sup>-</sup> belong to the Iron atom?

c) What is the outermost orbital for Iron atom?

d) State the correct stability of e<sup>-</sup> filled in the d orbital



3d



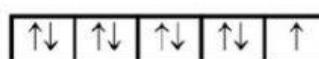
3d



3d



3d



3d

More stable the arrangement of the e<sup>-</sup> in the 3d orbitals, it is easier to form the ION

Stability of e<sup>-</sup> arrangement, filled in the orbital 3d:

Fully filled 3d orbitals >> Half Filled 3d orbitals >> partially filled 3d orbitals

e) Which of these two species is more stable? Explain.

Fe<sup>3+</sup> has \_\_\_\_\_ 3d orbitals while Fe<sup>2+</sup> has \_\_\_\_\_ 3d orbitals.  
 \_\_\_\_\_ is more stable because it contains \_\_\_\_\_ 3d orbital.

f) Give **A** possible set of quantum numbers of electrons in the outermost orbitals of iron(II) ions.

( n, l, m, s )

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