

Tutorial

Question 15.

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

Fe: $\begin{array}{ccccccccc} \square & \square & \square & \square & \square & \square & \square & \square \\ 1s & 2s & 2p & 3s & 3p & 4s & 3d & \end{array}$

Fe²⁺: $\begin{array}{ccccccccc} \square & \square & \square & \square & \square & \square & \square & \square \\ 1s & 2s & 2p & 3s & 3p & 4s & 3d & \end{array}$

Fe³⁺: $\begin{array}{ccccccccc} \square & \square & \square & \square & \square & \square & \square & \square \\ 1s & 2s & 2p & 3s & 3p & 4s & 3d & \end{array}$

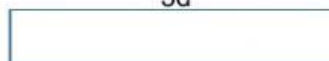
- b) How many valence e belong to the Iron atom?

- c) What is the outermost orbital for Iron atom?

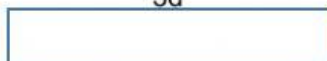
- d) State the correct stability of e filled in the d orbital



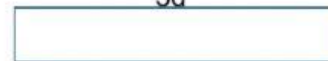
3d



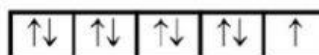
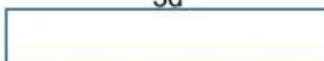
3d



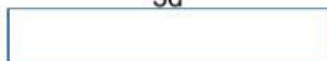
3d



3d



3d



More stable the arrangement of the e in the 3d orbitals, it is easier to form the **ION**

Stability of e 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.

Fe³⁺ has _____ 3d orbitals while Fe²⁺ 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)
(, , ,)