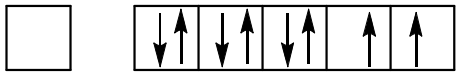
- Compounds of *d*-block elements are frequently paramagnetic. Using the box notation to represent atomic orbitals, account for this property in compounds of Ni^{2+}. **2**

The Ni atom has the electron configuration [Ar] $4s^2 3d^8$ and the Ni^{2+} ion has the configuration [Ar] $3d^8$ as the two electrons are removed from the 4s orbitals.

The electrons in the d-orbitals are arranged to minimize the repulsion between them. This results in two of the electrons being unpaired.



4s **3d**

The presence of unpaired electrons leads to paramagnetism.

- Complete the following table. **6**

Formula	Oxidation state of transition metal	Coordination number of transition metal	Number of *d*-electrons in the complex ion	Species formed upon dissolving in water
$K_3[Mn(CN)_6]$	**III**	**6**	**4**	**K^+(aq)** **$[Mn(CN)_6]^{3-}$(aq)**
$[Ru(NH_3)_5(OH_2)](NO_3)_2$	**II**	**6**	**6**	**$[Ru(NH_3)_5(OH_2)]^{2+}$(aq)** **NO_3^-(aq)**
$[Cr(en)_3]Cl_3$	**III**	**6**	**3**	**$[Cr(en)_3]^{3+}$(aq)** **Cl^-(aq)**

en = ethylenediamine = $NH_2CH_2CH_2NH_2$