

Tables & Cheat Sheet for d & f-Block Formulas

Ace up your preparation & solve all the problems related to this concept by using the given d & f-Block formulae sheet or tables. D & F-Block concept is no more considered as a difficult topic for students after referring and memorizing the provided d & f-Block formulas using the sheet or tables. Check out the important formulas of d & f-Block and understand the concept in a better way.

1. d-block elements are called transition elements because their properties are in between those of s-block and p-block elements.

2. General electronic configuration of d-block elements is $(n - 1)d^{1-9} ns^2$ & f-block is $(n - 2)f^{1-14} (n - 1)d^0 ns^2$.

3. There are four transition series, called 3d, 4d, 5d and 6d series. The elements present in them are: 3d (Sc – Zn), 4d (Y – Cd), 5d (La, Hf – Hg), 6d starts with Ac but is incomplete.

4. The elements of the 1st transition series are:

Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn

5. Some transition elements showing exceptional electronic configuration are:

Cr (3d⁵ 4s¹), Cu(3d¹⁰, 4s¹),

Mo (4d⁵ 5s¹), Ru(4d⁷ 5s¹),

Rh (4d⁸ 5s¹), Pd(4d¹⁰, 5s⁰),

Ag (4d¹⁰ 5s¹), La(5d¹, 7s²),

Pt (5d⁹ 6s¹), Au(5d¹⁰, 6s¹),

6. Zn, Cd and Hg are not considered as transition elements because their d- orbitals are completely filled. Unlike other transition metals, they are not hard because they do not contain unpaired electrons and metallic bond in them is weak.

7. Greater the number of unpaired electrons, stronger is the metallic bond and hence higher is the melting point. That is why melting points first rise to a maximum and then fall.

8. The first ionisation energy of 5d elements is higher than those of 3d and 4d elements due to intervening 4 f electrons thereby weakening the shielding effect.

9. IE₁ + IE₂ for Ni is less than that of Pt, Hence Ni (II) compounds are more stable than Pt (II) compounds. IE₁ + IE₂ + IE₃ + IE₄ for Pt is greater than that Ni. Hence Pt (IV) compounds are more stable than Ni (IV) compounds.

10. The maximum oxidation state shown by transition element is + 8 (by Rh.) Os shows maximum of + 7.
11. The catalyst used in Fischer-Tropsch process for synthesis of gasoline (petrol) is Cobalt- Thorium.
12. Cu (II) salts absorb red wavelength for d-d transition and look blue (because red and blue are complementary colour).
13. The complex $[\text{Ti}(\text{H}_2\text{O})_6]^{3+}$ absorbs yellow wavelength from visible light. Hence blue and red are transmitted. Their mixed effect is purple.