



ASSIGNMENT NPTEL
20-02-2022



As per HSAB principle, the hard bases have:

- a) High electronegativity
- b) Low electronegativity
- c) Highest occupied molecular orbitals of high energy
- d) Tendency to bind with soft acids

- a
- b
- c
- d

HARD ACID Small ionic radius High positive charge Low electronegativity High energy LUMO	SOFT ACID Large ionic radius Low positive charge Intermediate electronegativity Low energy LUMO
HARD BASE Small radius High electronegativity Weak polarizability High energy HOMO	SOFT BASE Large radius Intermediate electronegativity High polarizability Low energy HOMO

Ans. a

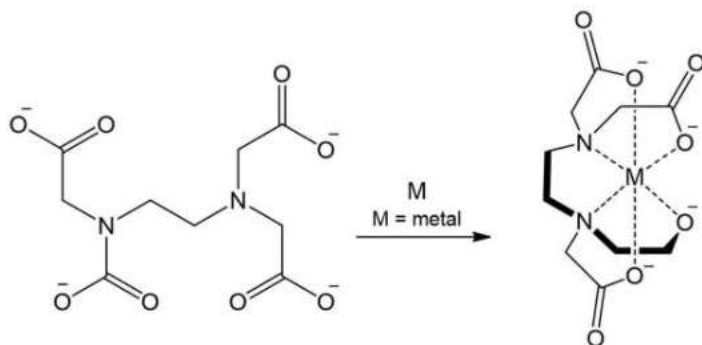


Which one is the INCORRECT statement for 'Chelation reaction'?

- a) The formation constant is very large.
- b) Entropy of the reaction increases
- c) It is thermodynamically favored reaction
- d) It is not a spontaneous reaction

- a
- b
- c
- d

Ans. d





For the formation of coordinate covalent bond in a metal complex, the characteristics of metal and ligand are:

- a) Metals have vacant hybrid atomic orbitals
- b) Ligands have vacant atomic orbitals
- c) Metals have occupied hybrid atomic orbitals
- d) Both metals and ligands have vacant atomic orbitals

- a
- b
- c
- d

Ans. a



NPTEL

What is the electronic configuration of Co^{2+} in tetrachlorocobaltate(II) ion?

- a) d^5
- b) d^7
- c) d^8
- d) d^{10}

- a
- b
- c
- d

Ans. b

	electronic configuration	no. of unpaired electrons					
Co^{2+}	d^7 <table border="1"><tr><td>$\uparrow\downarrow$</td><td>$\uparrow\downarrow$</td><td>\uparrow</td><td>\uparrow</td><td>\uparrow</td></tr></table>	$\uparrow\downarrow$	$\uparrow\downarrow$	\uparrow	\uparrow	\uparrow	3
$\uparrow\downarrow$	$\uparrow\downarrow$	\uparrow	\uparrow	\uparrow			
Cr^{2+}	d^4 <table border="1"><tr><td>\uparrow</td><td>\uparrow</td><td>\uparrow</td><td>\uparrow</td><td></td></tr></table>	\uparrow	\uparrow	\uparrow	\uparrow		4
\uparrow	\uparrow	\uparrow	\uparrow				
Mn^{2+}	d^5 <table border="1"><tr><td>\uparrow</td><td>\uparrow</td><td>\uparrow</td><td>\uparrow</td><td>\uparrow</td></tr></table>	\uparrow	\uparrow	\uparrow	\uparrow	\uparrow	5
\uparrow	\uparrow	\uparrow	\uparrow	\uparrow			
Fe^{2+}	d^6 <table border="1"><tr><td>$\uparrow\downarrow$</td><td>\uparrow</td><td>\uparrow</td><td>\uparrow</td><td>\uparrow</td></tr></table>	$\uparrow\downarrow$	\uparrow	\uparrow	\uparrow	\uparrow	4
$\uparrow\downarrow$	\uparrow	\uparrow	\uparrow	\uparrow			



Which one of the given metal ion exhibits diamagnetic properties?

a) Co^{2+}

b) Cr^{2+}

c) Mn^{2+}

d) Zn^{2+}

a

b

c

d

Ans. d



The limitation of VB theory is:

- a) It cannot account for the colour of the complexes
- b) It can account for the spectrochemical series
- c) It cannot describes the electronic structure of molecules
- d) It can nicely predict the magnetism and colour of the complex

- a
- b
- c
- d

Ans. d

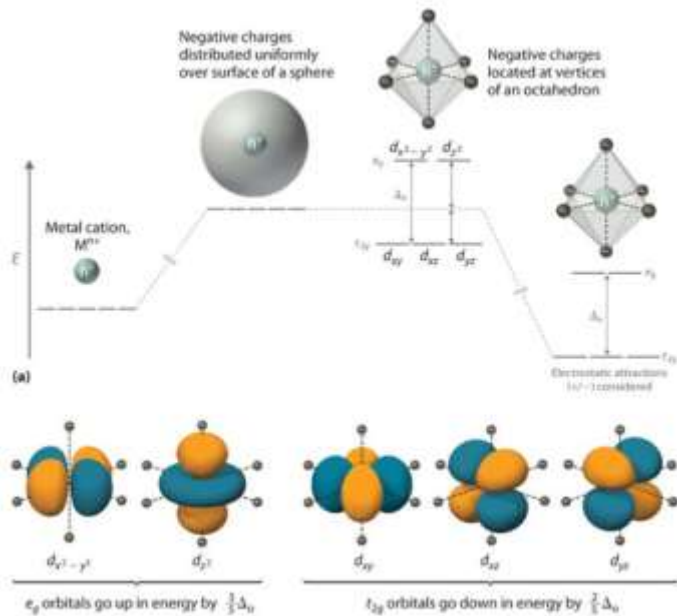


What is the energy difference between t_{2g} and e_g levels?

- a) $10 Dq$
- b) $6 Dq$
- c) $4 Dq$
- d) $-6 Dq$

- a
- b
- c
- d

Ans. a





In octahedral field the doublet states of e_g level are:

- a) d_z^2 and d_{xy}
- b) $d_{x^2-y^2}$ and d_{zx}
- c) d_z^2 and $d_{x^2-y^2}$
- d) d_{xy} and d_{yz}

Ans. c