Pavitra Sharma
RA2111026010210
Pavitra.

Q1) Question No 35.

Ans Fajans rule: state that :-

① Size of the ions :- Smaller the size of cation, the larger the size of the anion greater is the covalent character of the ionic bonds

② The charge of cation :- Greater the charge of cation, greater is the covalent character of the ionic bond.

Example :- By Fajans Rule, compound are more likely to be ionic if there is small positive charge on the cation, the cation is large, and the anion is small.

Ex No 1 → NaCl is predict to be ionic since Na^{+} is a largen ion with a low charge and Cl^{-} is a smaller anion.

Ex No 2 → ~~$AlCl_3$~~ $MgCl_2$ predict to be ionic since Mg^{2+} is a large ion with a low charge and Cl^{-} is a smaller anion.

Q2) Question No 33.

Ans Laporate rule :-

① The transition which involve a charge in the outside of quantum number are allowed $\boxed{\Delta l = \pm 1}$

② Hence the transition are allowed otherwise Laporate state that the only allowed transition are ~~there~~ those with a charge of Paisity

③ Gerade to ungerade (G → U), ungerade to gerade (U → G) are allowed

④ But (g → g) and (U → U) are not allowed i.e. forbidden to transition.

⑤ i.e. it state that Electronic transition that converse paisity are forbidden

Q3) Question No 37.

Ans ① The amount of Energy released when an Electron is added to the valence shell of an isolated gaseous atom of that element, Converting the gaseous atom to a negative ions

② it increase when ~~use~~ we move from left to right in a period and decrease when moving down the group

③ it is always an Exothermic reaction since ΔH is negative

Eq $X_{(g)} + e^{-} \rightarrow X^{-}_{(g)} + Energy$

④ Now since, atomic size increases down the group Electron affinity generally decreases. As the valence Electron are loosely attached to nucleus and d & f orbital the order is $I < Br < F < Cl$

⑤ Flowine has a lower Electron affinity than chlorine because its size is smaller than chlorine and inter Electronic repulsion reduce the Electron affinity.

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Pavitra

Q4) Question No 36

Ans → The first ionisation Energy of Al is lower than mg. because Al contain unpaired Electron in $3p^1$ orbital. it is Easier to remove this orbital. Whereas Mg contain paired $3s^2$ orbital due to which Shielding Effect of S orbital. it is difficult to remove Electron from mg.

→ Since breaking a paired group of Electron required more Energy Compared to unpair Electron the first Ionisation Energy of Al is lower than mg.

→ Al = $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^1$

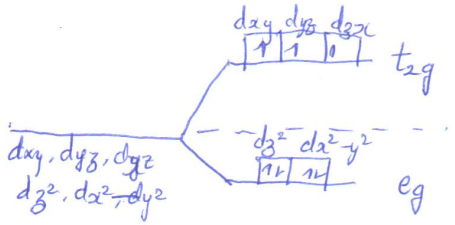
Mg = $1s^2\ 2s^2\ 2p^6\ 3s^2$

it is Energetically favorable for all the Electron in an orbital to be Paired, which means that breaking up this pair would requires more Energy.

Q5) Question No 31

Ans Given i) d7 & d8 convifration
ii) tetrahedral complex.
iii) High Spin complex.

(a) d7

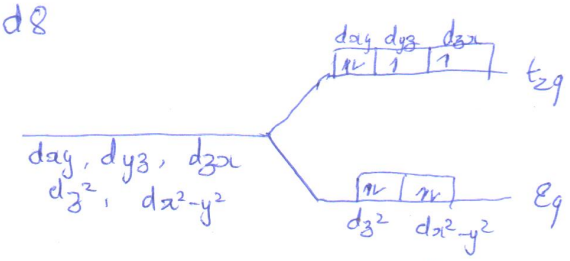


$e_g^4\ t_{2g}^3$

① CFSE = $(-0.6x + 0.4y)\Delta_t + Mp$
$= (-0.6(4) + (0.4)3)\Delta_t$
$= -1.2\Delta_t$

② Magnetic Moment :- $\sqrt{n(n+2)}$ BM
$= \sqrt{3(3+2)}$ Bm
$= \sqrt{15}$ Bm $= 3.87$ BM.

(b) d8



$e_g^4\ t_{2g}^4$

① CFSE = $(-0.6x + 0.4y)\Delta_t + Mp$
$= (-0.6(4) + 0.4(4))\Delta_t$
$= -0.8\Delta_t$

② Magnetic Moment :- $4 = \sqrt{n(n+2)}$ BM
$= \sqrt{2(4)}$ BM
$= \sqrt{8}$ Bm $= 2.83$ BM