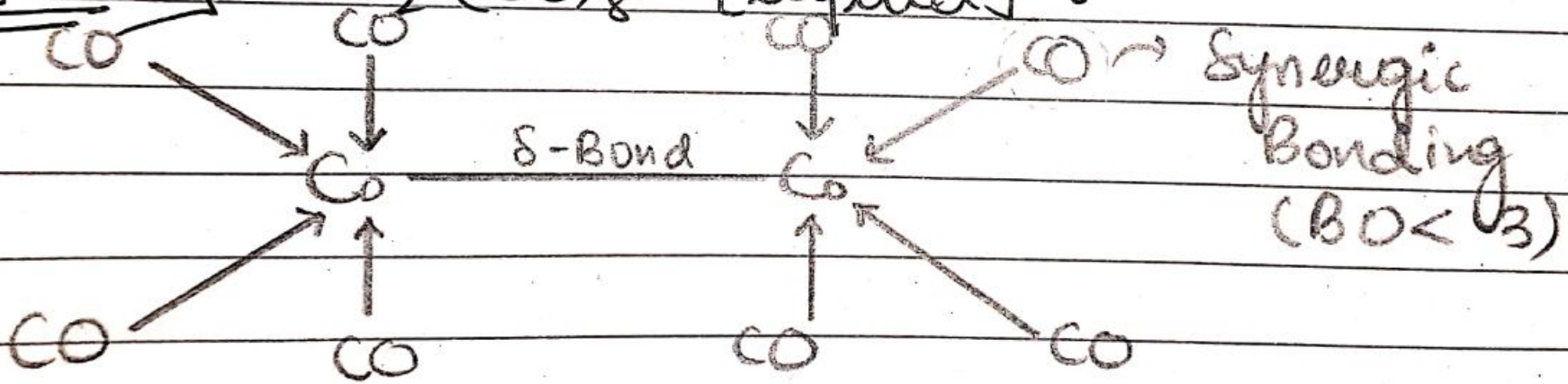
Dimerisation :-

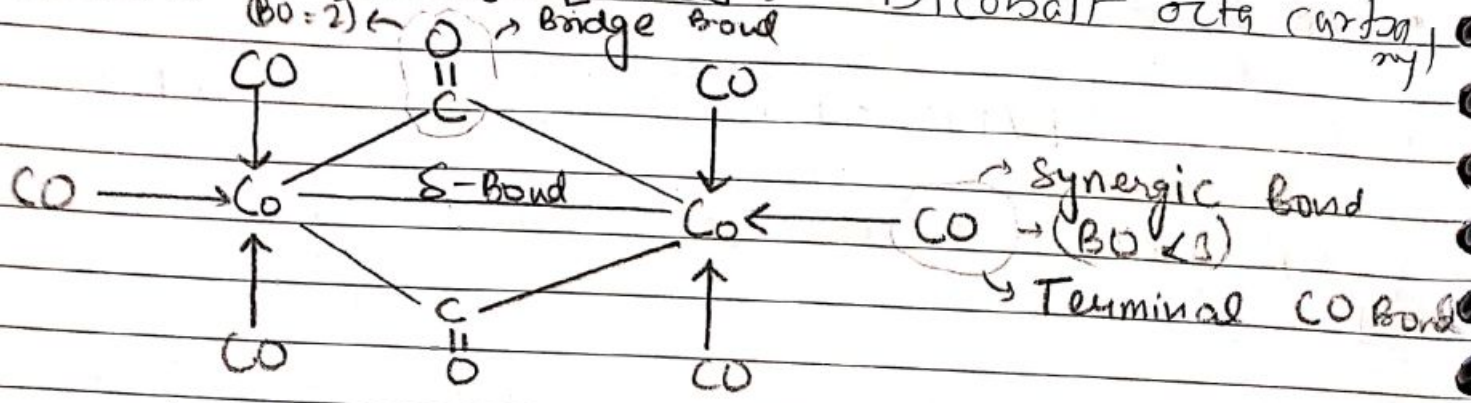
(A) $Co_2(CO)_8$:-

$2\,Co(CO)_4$ (EAN = 35) $\xrightarrow{\text{Dimerisation}}$ $Co_2(CO)_8$ (EAN = 36)

Case-I] $Co_2(CO)_8$ [liquid] :-

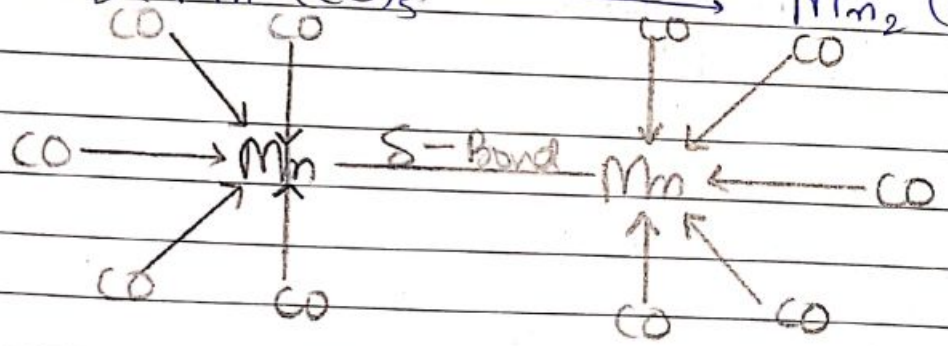


Case-II) $Co_2(CO)_8$ [Solid] :- Dicobalt octa carbonyl

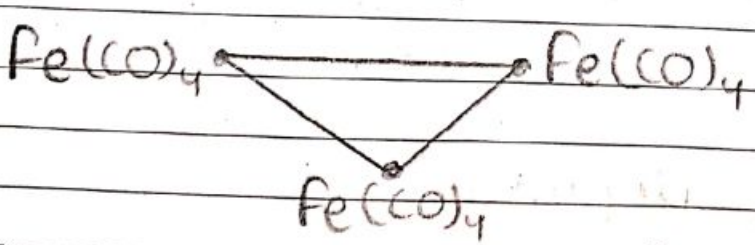


No. of Terminal CO Bonds = 2 × 3 = 6 (BO < 3)
No. of Bridge CO Bonds = 2 (BO = 2)

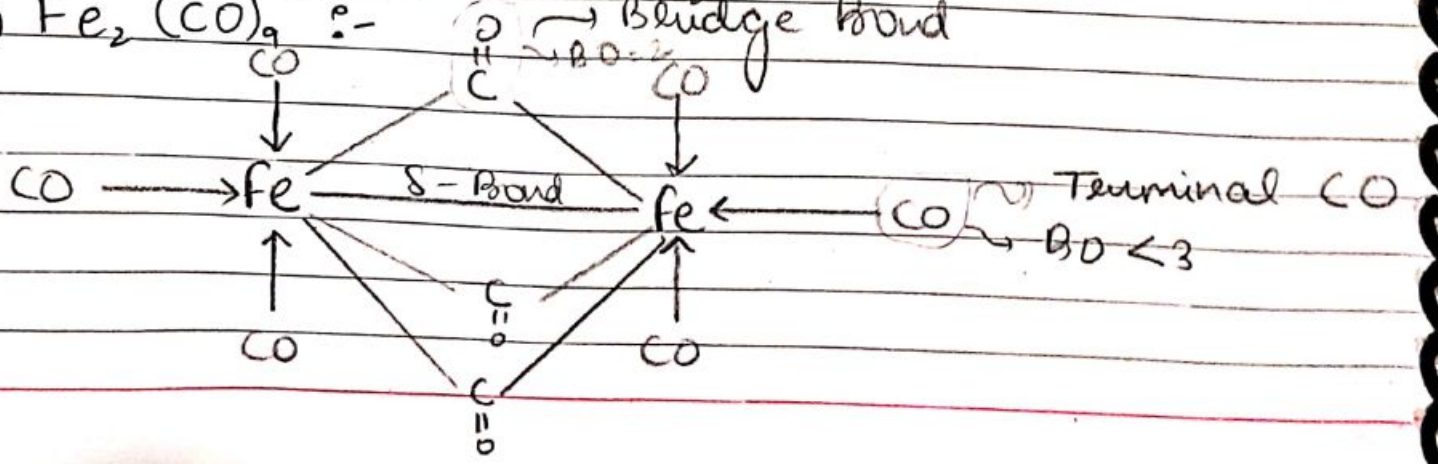
(B) $Mn_2(CO)_{10}$
2 $Mn(CO)_5$ → (Dimerisation) → $Mn_2(CO)_{10}$



(C) $Fe_3(CO)_{12}$:- Triiron dodecarbonyl



(D) $Fe_2(CO)_9$:-



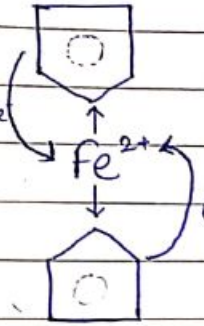
(E) Ferrocene :-

* Fe (π - Cyclopentadienyl)

(or)

$[Fe(\eta^5 - C_5H_5^-)_2]$

*



EAN = 26 - 2 + 6×2 = 36

~ Sandwich complex.

~ Coordination No. = Not Defined

(F) $[Cr(\pi - Benzene)_2]$ (or) $[Cr(\eta^6 - C_6H_6)_2]$

* Sandwich Complex.

* Coordination no. → Not Defined

* Structure :-

→ EAN = 24 - 0 + 6×2 = 36

(22) Organometallic Compounds :-

→ Compounds in which metals (having electronegativity less than carbon) attached to carbon containing alkyl /aryl group including CO (carbonyl) known as Organometallic comp.

Eg. :- $Fe(CO)_5$; $[Cr(CO)_6]$; $[Mn_2(CO)_{10}]$; R-MgX

CH_3-CH_2-MgBr , Ferrocene.

→ $K_4[Fe(CN)_6]$; $K[Ag(CN)_2]$; $C_2H_5ONa \rightarrow X$

(23) Applications of coordination compounds :-

(A) Red colour pigment of Haemoglobin has complex of Iron.

(B) Vitamin — B_{12} is complex of Cobalt

(C) Chlorophyll is complex of Magnesium

(D) $EDTA^{4-}$ is used to treat lead poising by formation of complex.

(E) Complex of Platinum, ie., Cis-Platin (cis $[PtCl_2(NH_3)_2]$) is used to treat cancer, i.e anticancer drug.

(F) Rhodium formed complex known as Wilkins-n catalyst $[Rh(PPh_3)_3Cl]$ used in hydroge-nation of organic compounds

(G) Ziegler - Natta Catalyst used in Organic Chemistry $(R_3Al + TiCl_4) / (R_3Al + TiCl_3)$

(H) In Metallurgy, complex of CN^- with Ag/Au are used as $[Ag(CN)_2]^-$; $[Au(CN)_4]^{3-}$; $[Ni(CO)_4]$

(I) Ca^{2+} & Mg^{2+} forms complex with $EDTA^{4-}$ during treatment of Water (Hardness of Water).

(J) $[Ni(dmg)_2]$ form has red-Cherry ppt colour.

(K) Prussian blue forms a complex in form of $Fe_4^{+3}[Fe^{2+}(CN)_6]_3$. as a blue coloured pigment in paint industry.

(24) Trans Effect :-

→ It is a chemical-kinetic effect to explain rate of incoming ligands towards a complex.

* Order of Trans Effect :-

$CO, CN^-, Py, C_2H_4 > I^- > Br^- > Cl^- > F^- > NH_3$

→ A group which is placed against a stronger group in a trans position leave its position.

for Example :-