Co-ordination Compounds [1.]

Degree-II (H) , Paper-III , Group-B

07/11/2020 **Revision**

Topic :-Classification of Ligands

(Continue..)

Bidentate Ligands

* Donate two lone pair of electrons. e.g. ethylene diamine

$H_2\ddot{N} - CH_2 - CH_2 - \ddot{N}H_2$

(en)

COO⁻
|
COO⁻

Oxalato(Ox)

;

$H_2\ddot{N} - CH_2 - COO^-$

glycinato(gly), etc.

Tridentate Ligands

* Donates 3 pair of electron.

e.g. $H_2\ddot{N} - CH_2 - CH_2 - \ddot{N}H - CH_2 - CH_2 - \ddot{N}H_2$

Diethylenetriamine (dien)

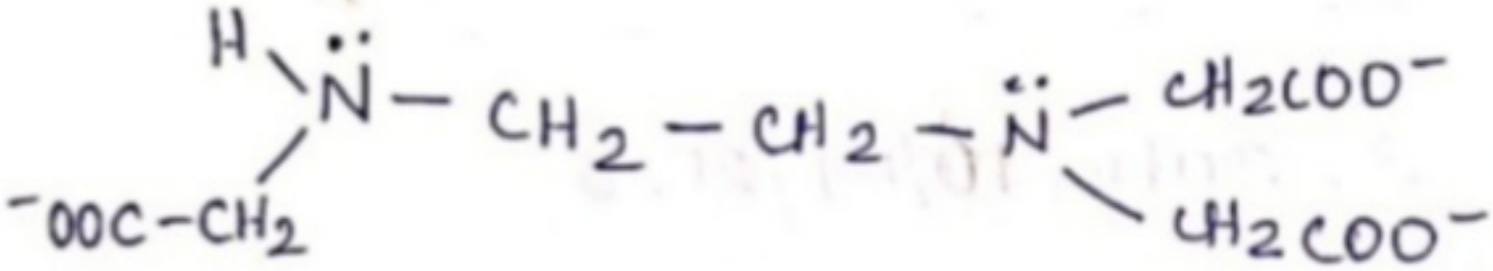
Tetradentate Ligands

$H_2\ddot{N} - CH_2 - CH_2 - \ddot{N}H - CH_2 - CH_2 - \ddot{N}H - CH_2 - CH_2 - \ddot{N}H_2$

Triethylenetetramine (trien)

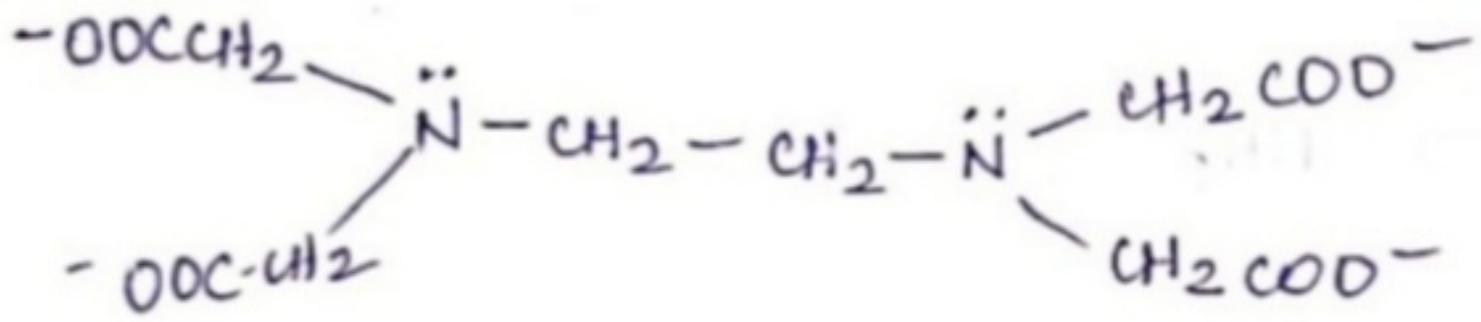
Pentadentate & Hexadentate Ligands

2.



Ethylenediaminetriacetato

(Pentadentate) $[EDTA]^{3-}$



Ethylenediaminetetraacetato

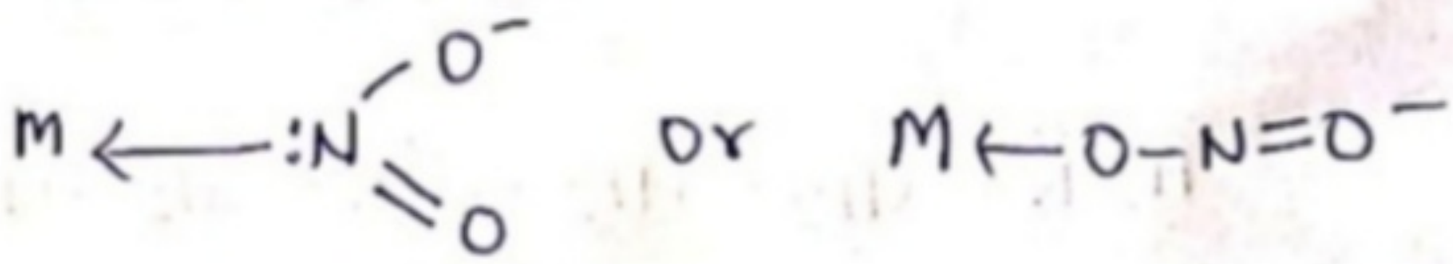
$[EDTA]^{4-}$

(Hexadentate)

Ambidentate Ligands

* Monodentate ligands having two different donor atoms can attached to metal cation through either of the donor atom.

eg. NO_2^-



Flexidentate Ligands

Behave as monodentate as well as bidentate ligands.

Ligands

Symmetric (AA) type

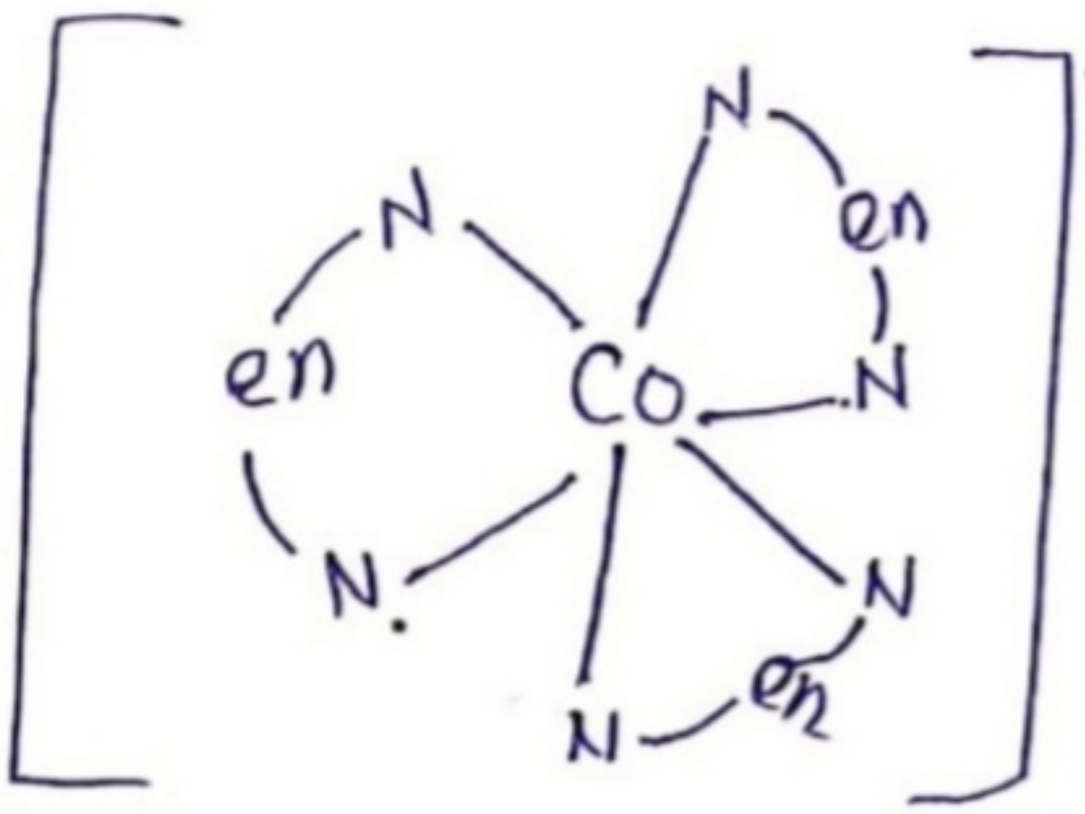
Both donor atoms are same.

Unsymmetric bidentate (AB type)

Both donor atoms are different.

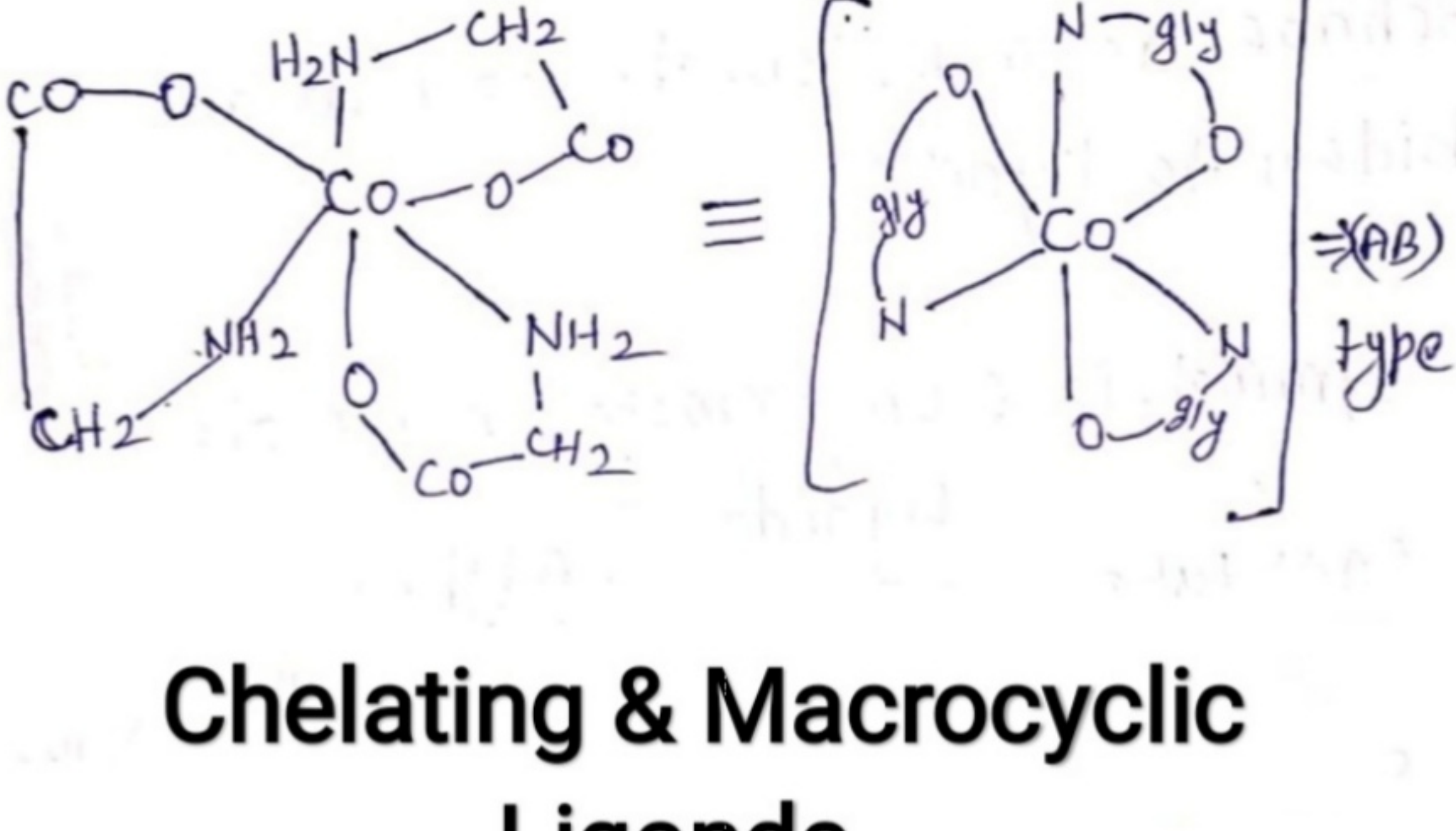
e.g. $[Co(en)_3]^{3+}$

en → $H_2\ddot{N} - CH_2 - CH_2 - \ddot{N}H_2$



⇒ (AA) type

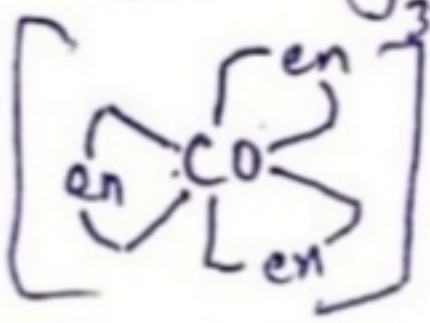
$[Co(gly)_3]$ Gly = $H_2N-CH_2-COO^-$



Chelating & Macrocyclic Ligands

When a di- or polydentate ligands uses, its two or more donor atoms to bind a single metal ion, it is said to be chelate ligands.

* Chelate ligands form cyclic structure with metals. e.g $[Co(en)_3]^{3+}$



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3rd