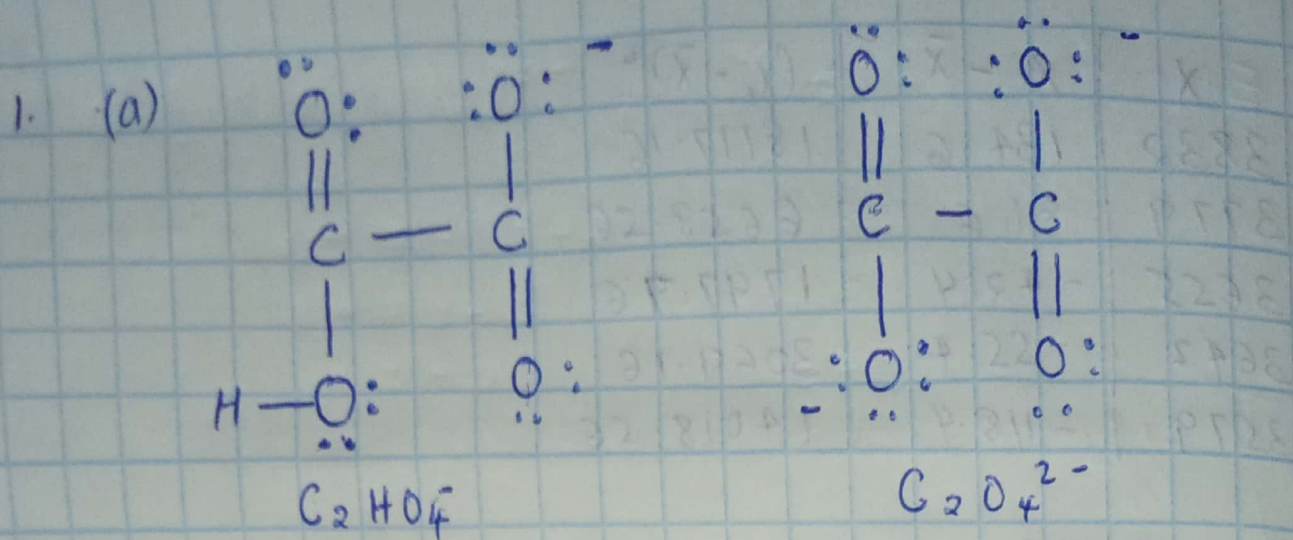
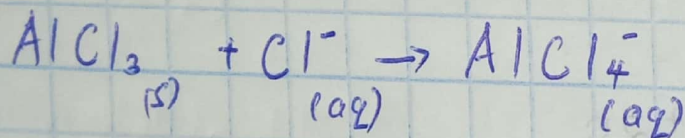




(b) $\text{C}_2\text{H}_2\text{O}_4$ and H^+ can act only as acid.
 $\text{C}_2\text{O}_4^{2-}$ can act as both acid and base
 C_2HO_4^- can act as base

2. Lewis acid - CO_2 , SO_2 , H^+ , BCl_3
 Lewis base - H_2O , I^- , NH_3 , OH^-

3.



AlCl_3 is a Lewis acid since it accepts an electron pair to form AlCl_4^-
 Cl^- is a Lewis base since it donates an electron pair to AlCl_3 .

4 (a) BF_3 is a stronger Lewis acid than BCl_3 since it has a higher affinity for the electron pairs.

(b) Fe^{3+} is a stronger Lewis acid than Fe^{2+}
 Fe^{3+} has a higher greater tendency to accept

electrons since it has lost 3 electrons.

5 (a) en - ethylenediamine

$$(b) \quad x + 2(0) + 1(0) + 1(-1) = +2$$

$$x + 0 + 0 - 1 = +2$$

$$x - 1 = +2$$

$$x = +2 + 1$$

$$x = +3$$

(c) There are two monodentate ligands and two bidentate ligands

Coordination number = 6

(d) en is a bidentate ligand

6 (a) $K_3[Fe(CN)_6]$

Fe oxidation number = x

$$3(+1) + x + 6(-1) = 0$$

$$3 + x - 6 = 0$$

$$x - 3 = 0$$

$$x = +3$$

$$Fe = +3$$

$$K = +1$$

(b) $K_3[Cr(C_2O_4)_3]$

$$Cr = x$$

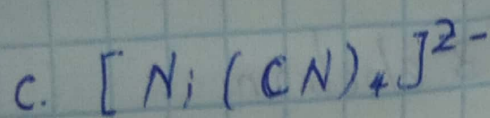
$$3(+1) + x + 3(-2) = 0$$

$$3 + x - 6 = 0$$

$$x = +3$$

$$Cr = +3$$

$$K = +1$$



$$Ni = x$$

$$x + 4(-1) = -2$$

$$x + 4 = -2$$

$$x = +2$$

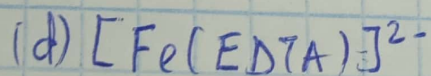
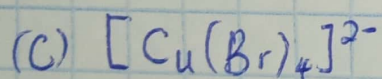
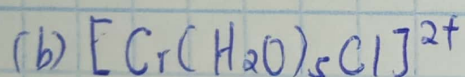
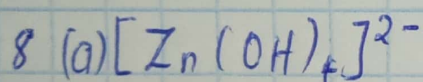
$$Ni = +2$$

7 (a) Tetraamminedichlorocobalt(III) ion

(b) Triamminetrichlorochromium (III)

(c) Dibromobis(ethylene diamine) cobalt (III) ion

(d) Hexaammine cobalt(III) chloride



9. Oxalic acid reacts with rust (Fe_2O_3) to form a stable iron-oxalate which is soluble and can be washed away easily.

10. EDTA removes metal ions like Ca^{2+} and Mg^{2+} to prevent growth of bacteria.