1. **2 and octahedral**

   Two 1,4,7-Triazacyclononane(TACN) moiety is required to coordinate Mn metal ion in its octahedral geometry.

2. **Trigonal bipyramidal, +2**

   Tris(2-aminoethyl)amine binds copper in TBP Geometry, where one Cu-halide bond is present.

3. **2**

   2 oxygen act as two donor center.

4. **4**

   So, four pyrrole ring is present.

5. **Corrin**

   This is the structure of Vitamin B<sub>12</sub> which consist corrin ring.
6. 3  
The total no of isomers of Co(en)_2Cl_2 are cis and trans. The cis isomer exist as optical isomers because it does not have a mirror plane or centre of inversion i.e. cannot be superimposed on its mirror image, therefore it is chiral. So total isomers are three.

7. Sodium hexachlorophosphate(V)

8. [Co(H_2NCH_2CH_2NH_2)_3]^{3+}  
trans-[Co(H_2NCH_2CH_2NH_2)_2Cl_2]^+ & cis-[Co(NH_3)_4Cl_2]^+ both have plane of symmetry, so they are nonchiral.  
Pt(PPh_3)(Cl)(Br)(CH_3)]^- is a square planar complex, so no optical isomerism should be there.  
[Co(H_2NCH_2CH_2NH_2)_3]^{3+} exist as a pair of enantiomers. In such M(A-A)_3 complexes clockwise rotation is designated by ∆ and anticlockwise rotation by ∧

9. [Co(en)_3]_2(SO_4)_3  
Each SO_4 contains two negative charge, so total six negative. ‘en’ is neutral ligand. That means, each Co is in +3 oxidation state for charge neutralization.

10. Chlorobis(ethylenediamine)nitrito cobalt(III)

11. Co^{3+}  
Please see the structure of corrin ring given in the solution of Q5.

12. both π & σ donor

13. A and B only  
[PtCl(dien)]^+ has plane of symmetry, so it is achiral. Both [Cr(EDTA)]^- and [Ru(bipy)_3]^{3+} has neither plane of symmetry or a inversion centre. So, they are chiral.

14. AsMe_3, CN^-, SCN^-  

15. Triglycinatocobalt(III)  
*mer* and *fac* isomers are possible for complex with general formula [M(A-B)_3]. So Triglycinatocobalt(III) is the only example among all which can show both facial and meridional isomerism.