1) Conductor (Cu) | Electrolyte ($CuSO_4$)

Free e^-s
Solid State
P.C.

ions
molten/Aq. state
C.C.

2) Cations → Cathode (+ve) C→C
Anions → Anode (−ve) A→A.

3) CR →
AO →

4) Metal & H_2 → Cathode
Non-metals → Anode.

5) Electrolyte (HX)

S.E. — bulb glows brightly — H^+, X^- — Ions
W.E. — dimly — H^+, X, HX — Ions & molecules
N.E. — does not glow — HX — molecules.

6) Electrolysis depends on

Position of: C ↓ $K^+ Na^+ Ca^{2+} Mg^{2+} Al^{3+} Zn^{2+} Fe^{2+} Pb^{2+} H^+ Cu^{2+} Hg^+ Ag^+$; A. ↓ $SO_4^{2-} NO_3^- Cl^- Br^- I^- OH^-$

Conc^n — Higher the Conc^n Greater discharge.

Type of anode: Active Ni/Cu/Ag; Inert Gl/Pt/Fe.

7) Electrolysis of $PbBr_2$:- (molten)

$PbBr_2 \rightleftharpoons Pb^{2+} + 2Br^-$

Graphite:
C → $Pb^{2+} + 2e^- \rightarrow Pb$ (R) Grey
A → $Br^- - 1e^- \rightarrow Br$ (O)
$Br + Br \rightarrow Br_2$. Reddish brown vapours.

8) Electrolysis of acidified water :-

pure water doesn't conduct electricity. Add dil. H_2SO_4. dil. H_2SO_4 helps water to form ions.

$H_2O \rightleftharpoons H^+ + OH^-$
$H_2SO_4 \rightleftharpoons 2H^+ + SO_4^{2-}$

Pt:
C → $H^+ + 1e^- \rightarrow H$ ×4
$2H + 2H \rightarrow 2H_2$.
A → $OH^- - 1e^- \rightarrow OH$ ×4
$4OH \rightarrow 2H_2O + O_2$.

2:1 vol. $H_2 : O_2$.

At the end Conc^n H_2SO_4 does not change. Hence, it is catalysed reⁿ.

9) Anode (Pt) | Cathode (Cu) | Aq. $CuSO_4$ Sol^n (Blue) | Anode mud

$CuSO_4 \rightleftharpoons Cu^{2+} + SO_4^{2-}$
$H_2O \rightleftharpoons H^+ + OH^-$

C → $Cu^{2+} + 2e^- \rightarrow Cu$ Reddish brown
A → $OH^- - 1e^- \rightarrow OH$; $4OH \rightarrow 2H_2O + O_2$

Size of Cathode ↑es. Colour of $CuSO_4$ fades.

C → $Cu^{2+} + 2e^- \rightarrow Cu$ Reddish brown
A → $Cu - 2e^- \rightarrow Cu^{2+}$

Size of Cathode ↑es. Size of anode ↓es. Colour of $CuSO_4$ remains blue.

10) Nickel Anode | Aq. $Ni^{II}SO_4$ | Cathode

C → $Ni^{2+} + 2e^- \rightarrow Ni$
A → $Ni - 2e^- \rightarrow Ni^{2+}$

Anode: Silver | Aq. Ag^{I} Sol^n | Cathode

Complex Sol^n → Aq Sol^n $Na[Ag(CN)_2]$

$AgNO_3$ → Reaction will be very fast. Odd-even deposition → not used

C → $Ag^{1+} + 1e^- \rightarrow Ag$
A → $Ag - 1e^- \rightarrow Ag^{1+}$