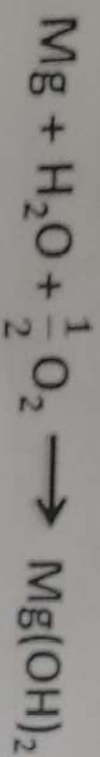
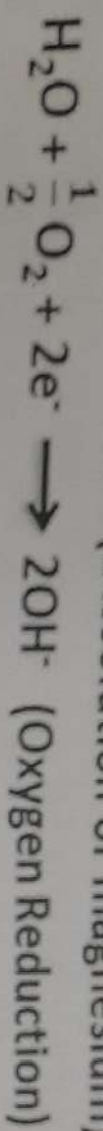
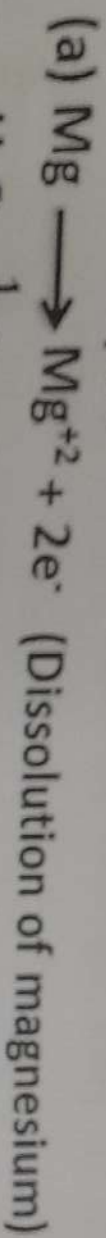


- A large negative free energy change may or may not be accompanied by a high corrosion rate.
- But when, ΔG° is positive, it can be stated with certainty that the reaction will not go at all under the particular conditions described. Therefore, gold does not corrode in aerated aqueous environment.

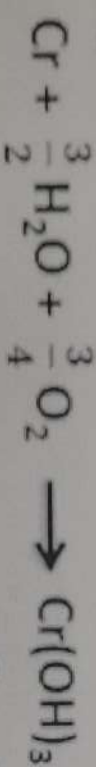
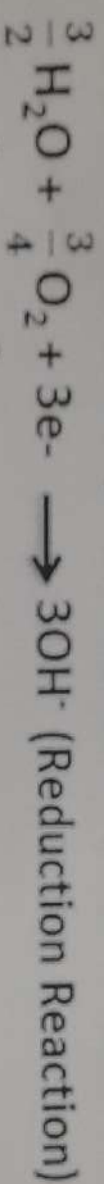


- The stability of elemental gold makes it less thermodynamically favorable to oxidized gold. Hence, it is more corrosion resistant.

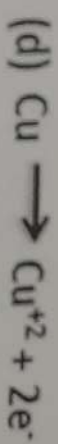
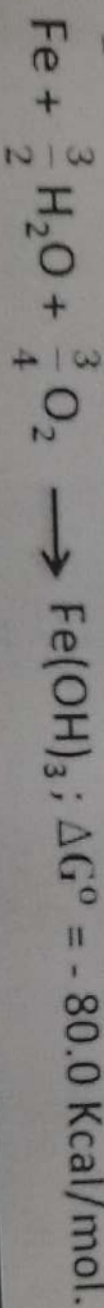
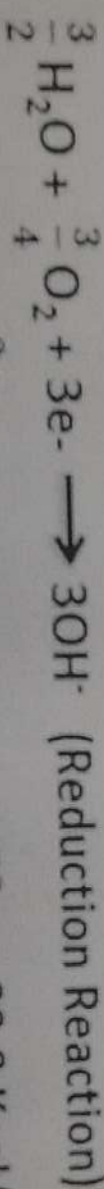
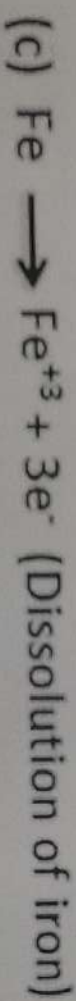
➤ For example:



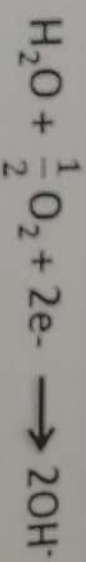
$$\Delta G^\circ = -142.6 \text{ Kcal/mol.}$$



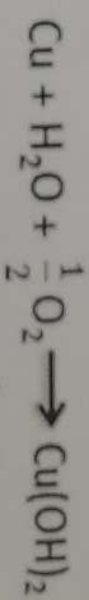
$$\Delta G^\circ = -117.0 \text{ Kcal/mol.}$$



(Dissolution of magnesium)



(Reduction Reaction)



$$\Delta G^\circ = -28.6 \text{ Kcal/mol.}$$

- The tendency of corrosion is enhanced due to the spontaneous instability of metallic substance with its environments.
- More stable the substance, more corrosion resistance the metallic substances or less corroded the substances in the given environments.
- In general, thermodynamics of both the metallic dissolution (anodic) and reduction (cathodic) reactions can be used to show the tendency of corrosion.
- For example, free energy change (ΔG°) of the anodic and cathodic reactions in a given environment can be indicated the tendency of the metallic corrosion.

$$\Delta G^\circ = -nF\phi^\circ$$

- Higher the value of (ϕ°) of a corrosion cell, higher is the tendency for the corrosion to go.
- Corrosion tendency of Mg metal is more pronounced than those of Cr, Fe and Cu metals in aerated aqueous environment, because the total standard free energy change (ΔG°) of Mg dissolution and oxygen reduction reactions is more negative value than those of Cr, Fe and Cu.

