

Q) Compare and contrast between various theories of corrosion.

Ans) Comparison of Corrosion Theories

Aspect	Chemical Corrosion (Dry)	Electrochemical Corrosion (Wet)
Environment	Occurs in dry or high-temperature environment	Requires moisture or an electrolyte
Mechanism	Direct chemical reaction between metal & gas	Formation of anodic and cathodic regions
Reaction process	Metal oxidizes directly with O_2 or other gases.	Involves electron flow between anodic & cathodic areas.
Examples of reaction	$Fe + O_2 \rightarrow Fe_2O_3$	$Fe \rightarrow Fe^{2+} + 2e^-$ $O_2 + 2H_2O + 4e^- \rightarrow 4OH^-$
Oxide layer	Forms an oxide layer; may be protective or porous	No continuous oxide layer; pits and cracks often form.
Common metal affected	Al, Cu, and other metals at high temp.	Fe, steel, and other metals in moist.
Examples of corrosion	Hightemp rusting, tarnishing	Rusting of iron in water, galvanic corrosion
Industrial relevance	Significant in high-temp equipment & engines.	Important in pipelines, marine environments, batteries.