CORROSION

All metals are thermodynamically unstable and tend to react with their environment to produce compounds such as oxides or carbonates. Corrosion of metals is influenced by their metallurgical composition and micro structure. Non-metals in general have good corrosion resistance under atmospheric conditions.

To understand the phenomenon of corrosion and the extent to which materials can resist corrosion, It is desirable to give requisite knowledge of the common forms of corrosion These are as follows.

(a) **UNIFORM CORROSION** :→

This is characterised by a chemical or electrochemical reaction which proceeds evenly and Uniformaly over the entire exposed area. It is indicated by a general wasting of surface area The corrosion product may from a protective layer on the metal or as in the case of direct chemical attack, the corroded material will dissolv in the corrosive environment

GALVANIC CORROSION

This occurs when tw dissimilar metals exposed to an electrically conductive environment are in direct conta electrically connected by a conductor or

or by a conducting medium. The anodic metal is affected and the cathodic metal is protected. For example, in coupling between steel pipe and copper fitting in a system, severe corrosion of steel is likely to occur.

(c) CONCENTRATION-CELL CORROSION

This is an intense, localised corrosion, which occurs due to oxygen concentration cells present in crevices, adherent deposits and deep recesses which obstruct the diffusion of oxygen and set up difference in solution concentration.

(d) PITTING CORROSION :→

This occurs between surfaces in close contact, usually under fairly heavy load and subject to very slight relative movement. The presence of Impurities, rough spots, and scratches may promote formation of pits. After pitting is started It tends to progress at an accelerated rate. pitting is often experienced, ~~it started It tends to progress at an accelerated rate~~ in those materials. Metallic impurities on the surface of a metal can also be a cause of pitting.

(e) INTERGRANULAR CORROSION:

(f) SELECTIVE ATTACK (leaching):-

(g) STRESS CORROSION.

This corrosion is the result of internal or external stresses corrosive environment. It manifest itself in the form cracks and is known as stress corrosion cracking. Metals and some plastics suffer this effect, with plastics it is called environmental cracking.

(e) INTERGRANULAR CORROSION

This consists of localised attack & intercrystalline cracking along the grain boundaries of the metal, occasionally when grains are loosened and fall away from a component. This type of corrosion leads to loss of strength, ductility and metallic ring.

(f) SELECTIVE ATTACK (Leaching) ⇒

In this type of corrosion, one element of metal or alloy is singled out for attack. The common types are dezincification, dealuminification and graphitic corrosion for example, if copper-zinc alloys (brasses) containing less than 85% copper are exposed to wet conditions for prolonged periods, zinc may go into solution and the redeposited copper has little mechanical strength.

(g) STRESS CORROSION.

This corrosion is the result of internal or external stresses & corrosive environment. It manifests itself in the form cracks and is often known as stress corrosion cracking. Most metals and some plastics suffer from this effect, with plastics it is usually called environmental cracking.

combination of corrosion and mechanical wear resulting from impingement of liquid or abrasion of solid particles.

(ii) Cavitation corrosion :→

This is the result of repeated collapse of vapour bubbles on a metal surface which cause mild physical damage to protective films & even deformation & fracture at surface.

(c) Thermogalvanic corrosion :→

When a metal is subjected to a thermal gradient by uneven heating, this has a similar effect on the metal as a galvanic corrosion. The metal is differentially polarised and anodic and cathodic area are formed causing preferred attack to develop