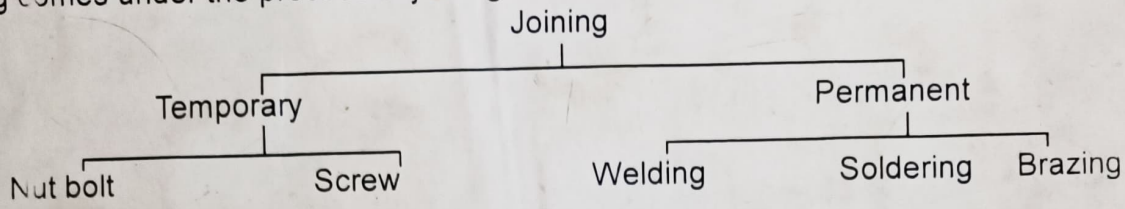
WELDING

Manufacturing process is the production of workpieces having defined geometric shapes, welding comes under the process of joining.



SOLDERING :- The joining of two metal pieces by means of heat & filler metal is known as soldering.

When the melting point of filler metal is below 400°c then the process is called soft soldering. And the filler metal used is known as "Solder". It is an alloy of lead and tin.

When the melting point of filler metal is above 400°c the process is called hard soldering and the solder is mixter of silver alloy and tin.

Soldering

Soft Soldering	Hard Soldering
Temperature - below 400°c	Temperature - above 400°c
Solder (Lead + Tin)	Solder (Silver alloy + Tin)

BRAZING :- The joining of two metal pieces by means of heat and special type of filler metal is known as "spelter" having the melting point temperature above 400°c but the lower than the melting point temperature of parts to be joined.

The copper base silver alloys are commonly used as filler metal for Brazing.

Brazing

Temperature -above 400°c and below the melting point tempeture of the part to be joined
Spelter - (Copper base silver alloys)

II.

Welding :-

Welding is a process of joining two similar or dissimilar metals by fusion, with or without use of filler metal (Electrodes) and with or without application of pressure.

Types of fusion welding

1. **Autogenous Welding** :- The process of joining similar metals without the addition of filler metal is called Autogenous welding.
2. **Homogenous Welding** :- The process of joining similar metals with the help of filler metal of the same metal is called homogenous welding.
3. **Hetrogenous Welding** :- The process of joining dissimilar metals using filler metal is called hetrogenous welding.

Weldability :-

Weldability is defined as the capacity of being welded easily.

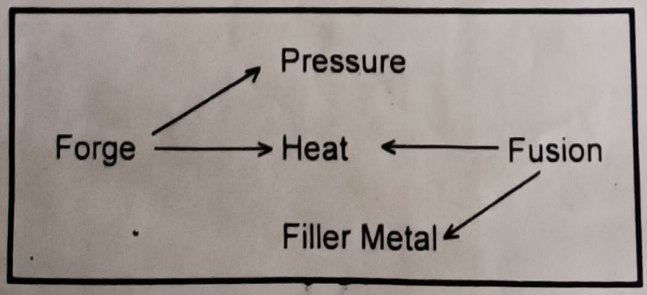
Welding depends upon the following factor -

1. Melting point temperature of parts to be joined.
2. Thermal conductivity.
3. Thermal expansion.
4. Surface condition.
5. Change in micro structure.

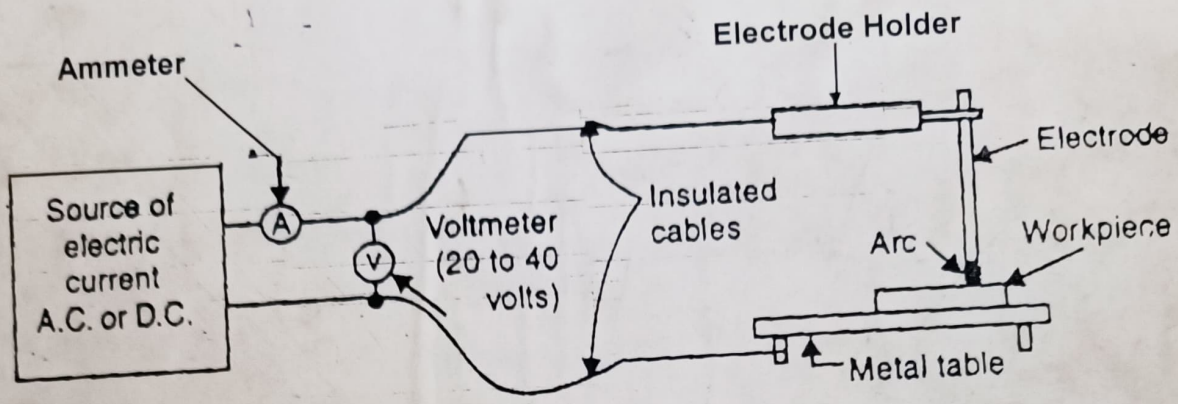
General classification of welding

Generally there two types of welding :-

1. Forge / pressure / plastic
2. Fusion / non-pressure / non plastic



III

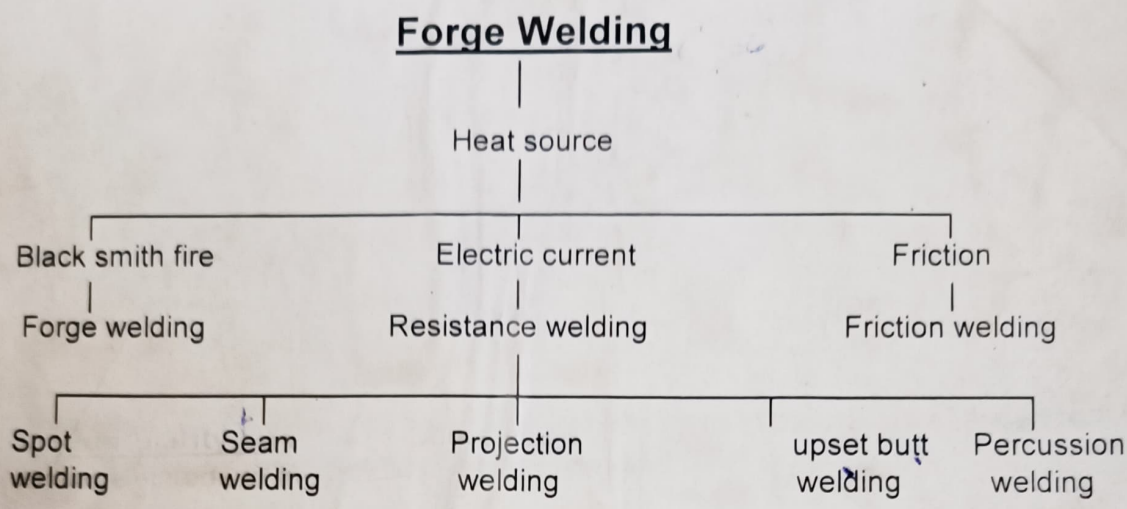


Set Up of Metal Arc Welding

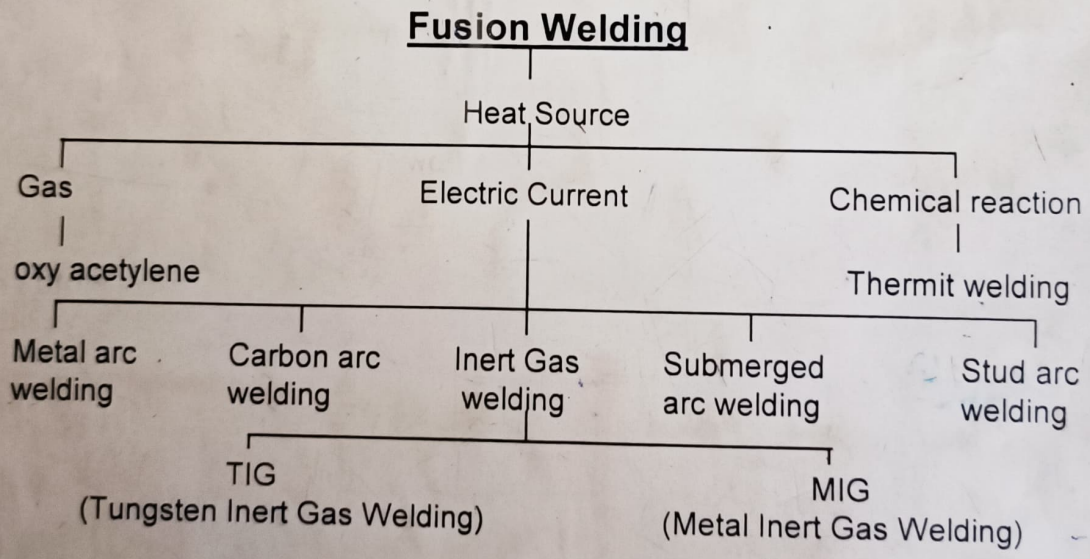
Sketch Arc Welding

IV

Forge Welding :- In forge welding the work piece is heated to plastic state and than joined together by applying pressure on them.



Fusion Welding :- In fusion welding the edge of workpiece to be joined and the filler metal are heated to a temperature above the melting point of the metal and allowed to solidify.

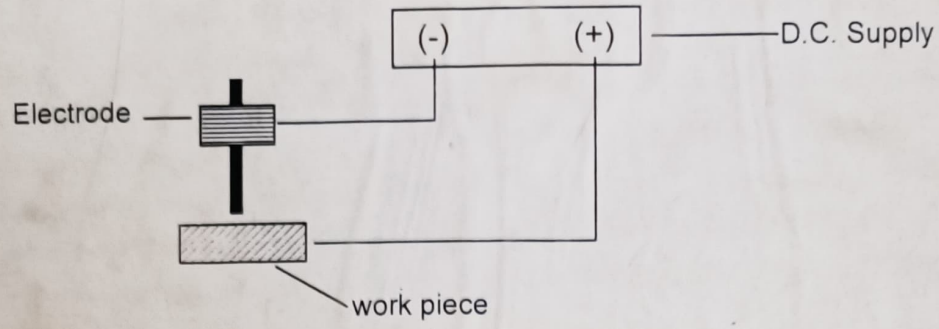


Terms accounts in welding :-

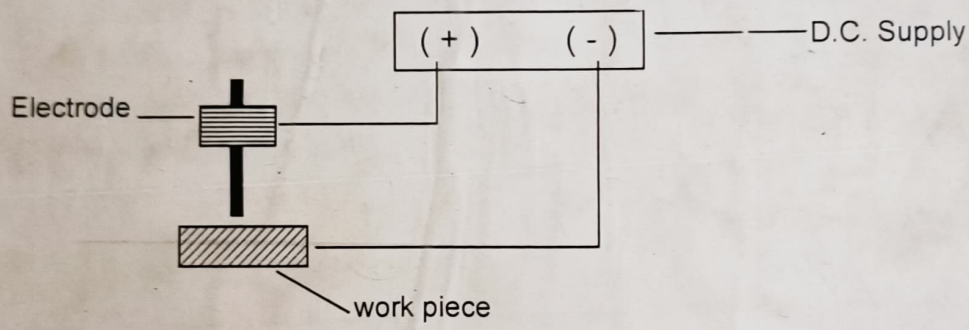
Polarity :- The polarity occurs only in D.C. welding. There is two type of polarity straight and reversed polarity. The things which is connected to the positions of D.C. source will melt 50% more then that of another one.

V

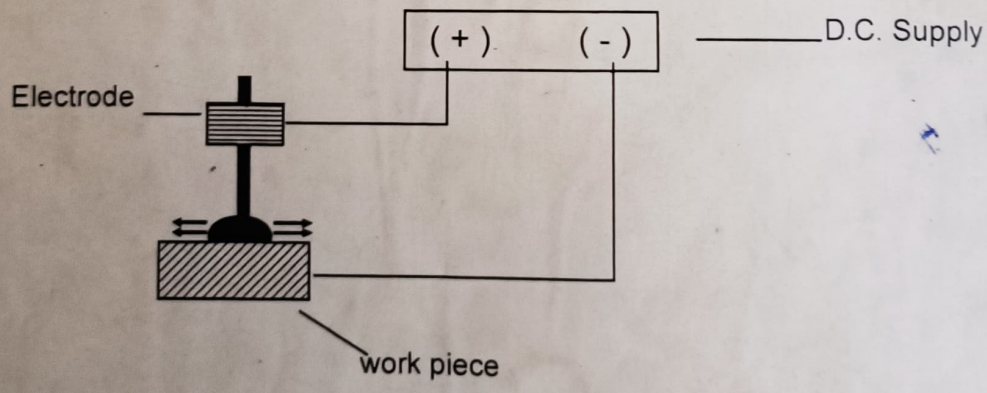
Straight Polarity :- When the work piece is connected to positive terminal of heat Supply and electrode to the negative then it is straight polarity.



Reversed Polarity :- When the work piece is connected to the negative terminal of heat supply and electrode to the positive then it is reversed polarity.



Arc blow :- It is defined as the deflection of arc from its intented path due to the creation of new electromagnetic field, which having direction perpendicular to the direction of electric current.



Tungsten inert gas (TIG) welding : -

In tungsten inert gas welding the heat is produced from an arch between non consumable tungsten electrode and work piece. The whole welding zone is shielded by an atmosphere of inert gas (helium or argan) supplied from a source and the nozzle of the gas surrounds the tungsten electrode, when the gas leaves the nozzle it completely surrounds the tip of electrode and work piece under it through this process the work piece is melted and the joining process takes place. In this process AC or DC supply may be use. TIG is used for copper alloy, stain steel alloy, cast iron, aluminum etc.

Metal inert gas welding (MIG) :-

In metal gas inert welding is similar to tungsten inert gas welding except that the electrode is consumable instead of nonconsumable. In this process filler metal wire of desired composition is automatically and continuously fed from a reel of wire. The filler metal is deposited by the arc which is completely surrounded by an inert gas by virtue of this joining process takes place.

Draw TIG and MIG Welding