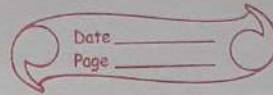


# WELDING SHOP



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Batch :- B-10

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## Assignment :- 2

Que:- What is welding? Describe the arc welding process.

Ans:- Welding is a process for joining two similar or dissimilar metals by fusion. Welding is an atomic bonding process and the metallurgical bond is accomplished by the attracting forces between the atoms.

### Arc Welding:-

principle:- first, the contact is made bet. two conductors of electricity anode and cathode to create an electric circuit. when the flow of current is established they are separated by small distance and arc is formed.

Actually arc is a sustained electric discharge through the ionized gas column (called plasma) bet. two electrodes.

Positively charged ions moving from anode are impinging on cathode thus liberating heat. when 75% of heat is generated at the anode then electric energy is converted into intense heat in the arc which attains the temperature around  $5500^{\circ}\text{C}$ .



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If the air gap becomes too large for voltage the arc may be extinguished. Larger air gap requires higher potential differences.

The work piece is kept on the metallic table. One cable from power supply is connected to the electrode holder into which the electrode is gripped. Other lead is connected to the metallic table on which work piece is kept. When the electrode is brought into contact with work piece arc generates and welding takes place.

Que:-2 What is polarity in arc welding?

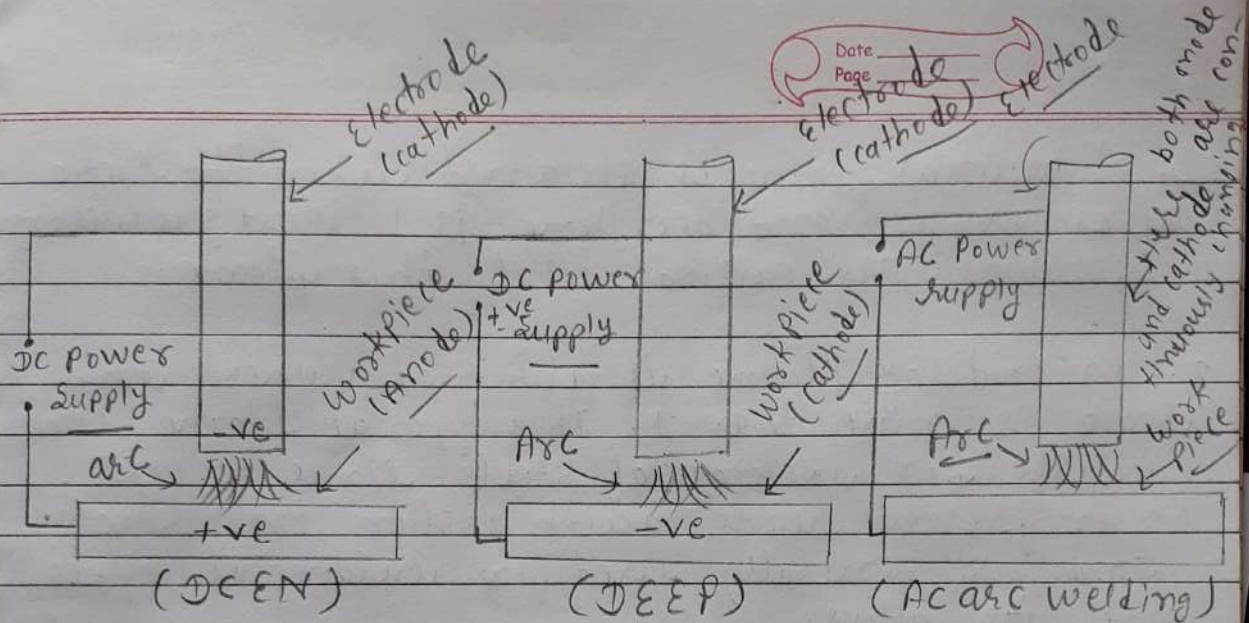
Ans:- In case of D.C. arc welding about 60% - 70% of heat is generated at anode and rest of heat is generated at cathode. If more heat is required on the work piece, materials having high thermal conductivity. The work piece may be made as anode liberating large heat near it. This arrangement is termed as straight polarity or DCEN (direct current electrode negative).

For thinner materials where less heat is required in the welding zone, the work piece may be made as cathode. This is termed as reverse polarity or DCEP (direct current electrode positive).

D.C. arc welding is preferred for difficult tasks such as overhead welding as it maintains stable arc.

For AC arc welding there is no question of polarity because anode and cathode will interchange after every half cycle.



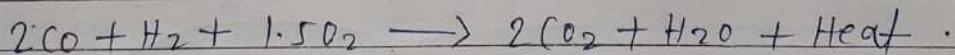


Que:-3 Write the oxy acetylene gas welding chemical reaction?

Ans:- (1) The heat is obtained by combination of acetylene and oxygen. Here primary combustion occurring in the inner zone gives:-

$$C_2H_2 + O_2 \rightarrow 2CO + H_2 + \text{Heat}$$

And the second reaction in the outer zone gives:-



(2) The maxi. temp. at the tip of inner cone reaches upto  $3000 - 3500^\circ C$ . Therefore, most gas welding is performed by keeping this inner zone tip just above the metal to be welded so that maxi. temp. is available for welding.

Que:-4 Explain how many types of gas flame used in welding.

Ans:-

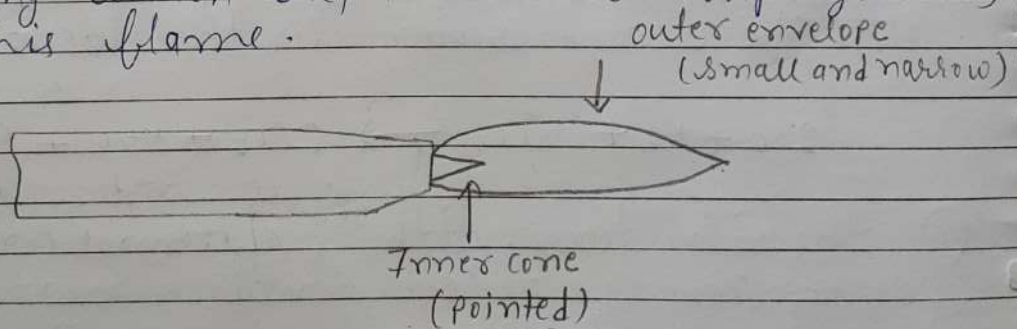
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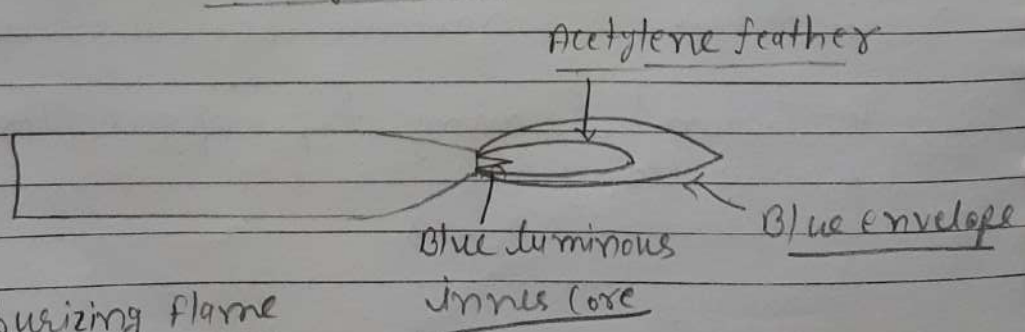
1. A neutral flame is obtained when the ratio of oxygen and acetylene is 1. Most gas welding operations are carried out by this flame.

2. An oxidising flame is obtained when this ratio is more than 1. This type of flame is not suitable for welding of steels since excess oxygen present reacts with carbon in steel and is generally used for welding of copper and its alloys.

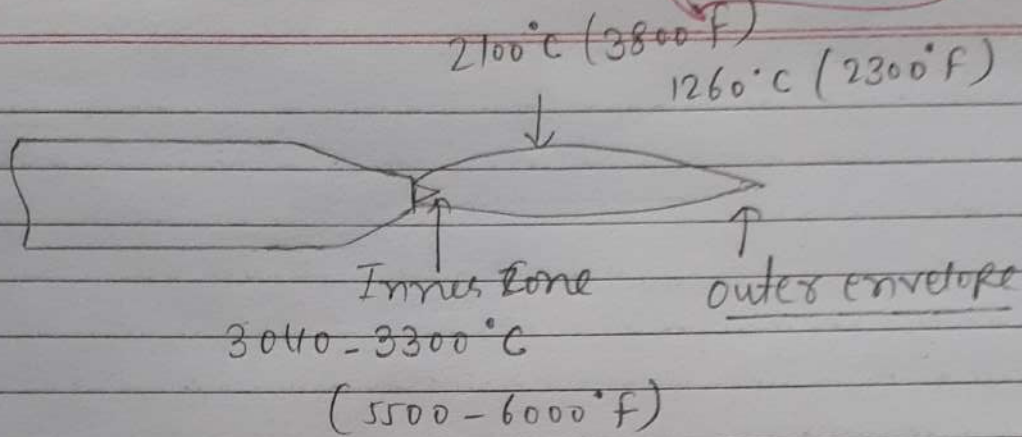
3. When the ratio in mixture is less than 1, a carburizing flame is obtained. In this type of flame acetylene decomposes into carbon and hydrogen and the flame temp. gets reduced. Joining operations such as brazing and soldering which require lower temp. generally use this flame.



oxidizing flame



Carburizing flame



Neutral flame