

## INTRODUCTION:

The metal plank having less than 2 mm thickness is called sheet metal. Sheet metal work deals with the production of components in wide variety of shapes and sizes from sheet metal, with aid of tools or machines metals used in sheet metal work variety of metal shop. The characteristics and uses of some of the important metals used in sheet metal work are described below:

**Galvanized iron:** It is a sheet of soft steel, which is coated with zinc. Zinc resists corrosion and improves the appearance of metal. Galvanized iron is one of the least expensive metals and is used for making pans, buckets, ducts, gutters, tanks, boxes, etc.

**Black iron:** It is uncoated sheet of metal with bluish-black appearance. It corrodes rapidly and is not used extensively due to difficulties of soldering. The black iron sheets are used for the parts that are to be painted.

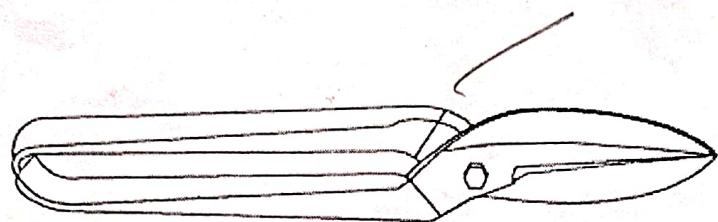
**Tin plate:** Tin plate is an iron or steel coated with pure tin. It has very bright silver appearance and is used for food containers, cans and pans.

**Stainless steel:** It is an alloy steel possessing corrosion resistance. General type stainless steel contains 18% chromium and 8% nickel. This steel is commonly known as 18-8% stainless steel. These are available in various sizes and thickness. It is widely used for food containers and dairy equipment.

**Copper:** It has reddish color and possesses good malleability, ductility and resistance to atmospheric corrosion.

**Aluminum:** Sheet aluminum is never pure aluminum and it is always allowed with small quantities of copper silicon, magnesium and iron.

## TOOLS AND EQUIPMENT:



Straight hand shear



Universal shear



Curved hand shear

Some of the tools used in fitting are also used in sheet metal work. Certain additional tools used by sheet metal worker are described below:

**Snips:** Hand shears or snips are used to cut sheet metal. Although there are many types, the sheet metal workers generally use straight snips and curved snips.

**Straight snips:** Straight snips have straight blades and are used for cutting along the straight lines and for trimming edges.

**Curved snips:** Curved snips has a curved blade and are used for cutting circles and irregular shapes.

**Bench shears:** Bench shear is used for cutting thicker sheets. It is the lower fixed blade firmly secured by bracket at the bottom. The movable blade is pivoted at the rear end; the hand operating lever is attached to the front end of movable blade in a link mechanism.

**Stakes:** Stakes are made of steel and forged in a variety of shapes and sizes. Its working face is machined and polished to facilitate various operations such as bending, seaming or forming. The following types of stakes are most generally used:

**Double seaming:** These stakes has two horns and it is used to make double seam for vessels.

**Blow horn:** These stakes has two horn tapering horns and it is used to form or seam funnels.

**Break horn:** These stakes has a square tapered horn on one side and a round tapered horn on opposite side. It is used for shaping round and square surfaces, bending edges and making corners.

**Conductor stake:** These stakes has two cylindrical horns having different diameters. It is used for forming pipes and cylindrical pieces.

**Funnel stake:** It is used for forming conical shapes and for making wire rings.

**Hatchet stake:** It has a horizontal sharp straight edge and can be used for making straight, sharp bends and for folding and bending edges.

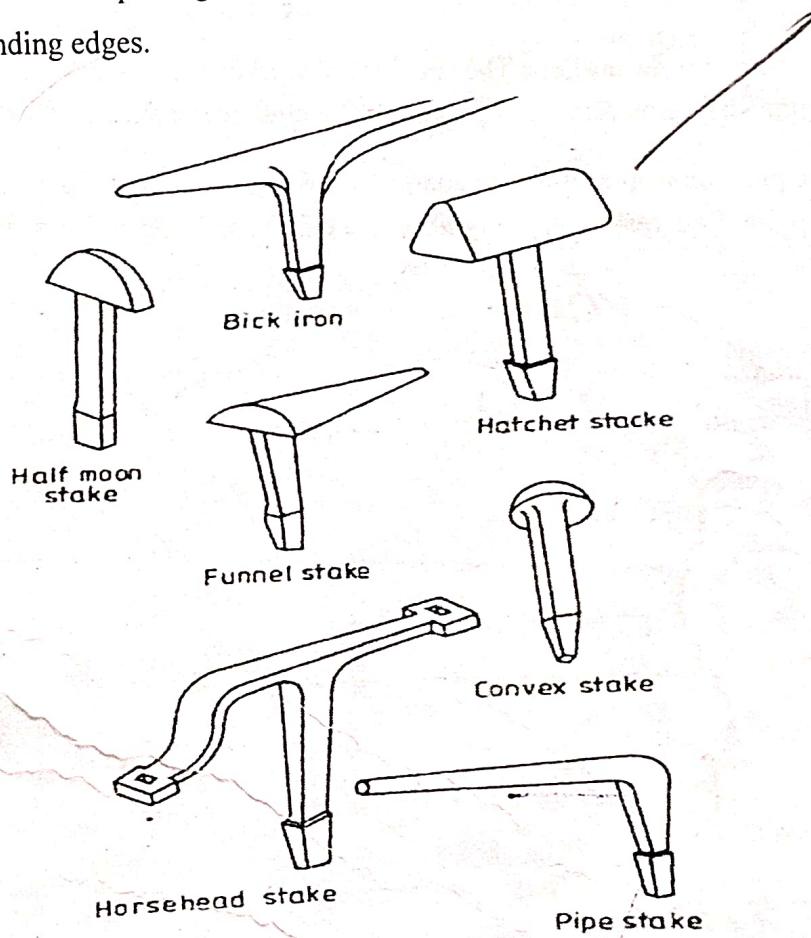
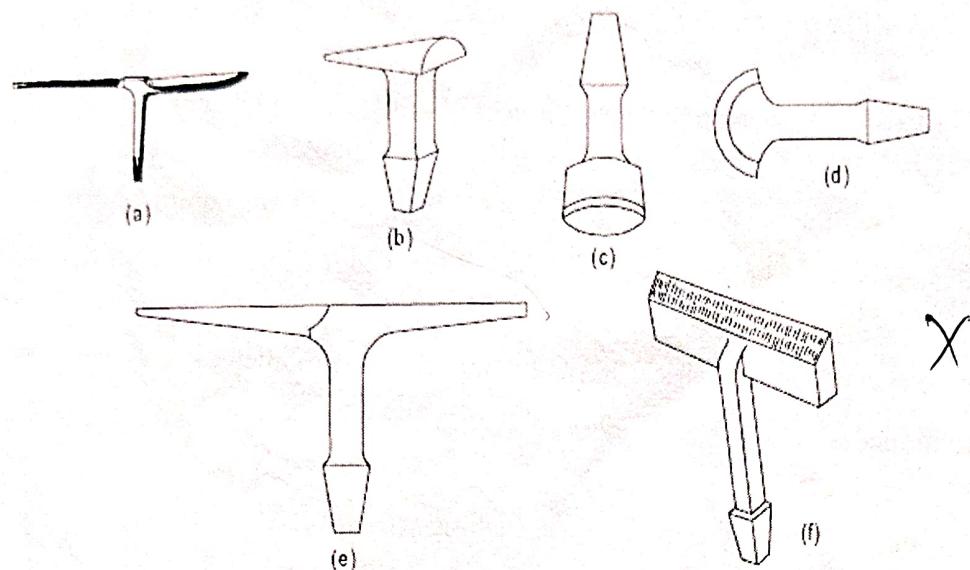
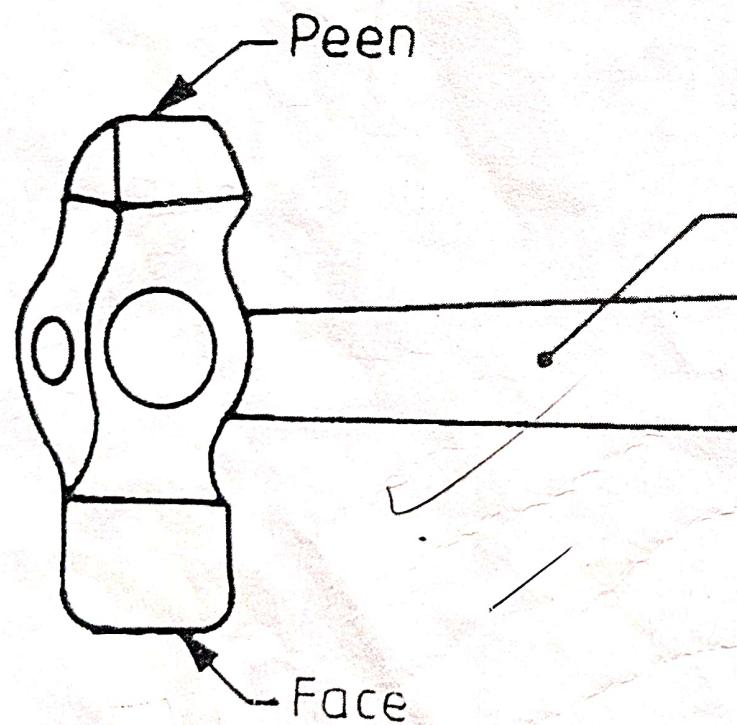


Fig. 10.6 Stakes

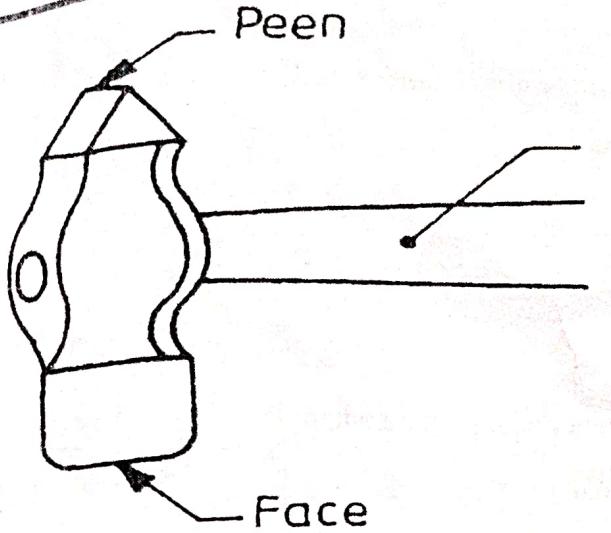


**Hand hammers and mallets:** The sheet metal worker uses a wide variety of hammers and mallets for forming shapes by different operation. The most commonly used hammers are as follows:

**Straight-peen hammer:** It has a peen end similar to its bottom size round shape and its top side is straight point. Square, slightly curved face and its peen is tapered. It is used for riveting.

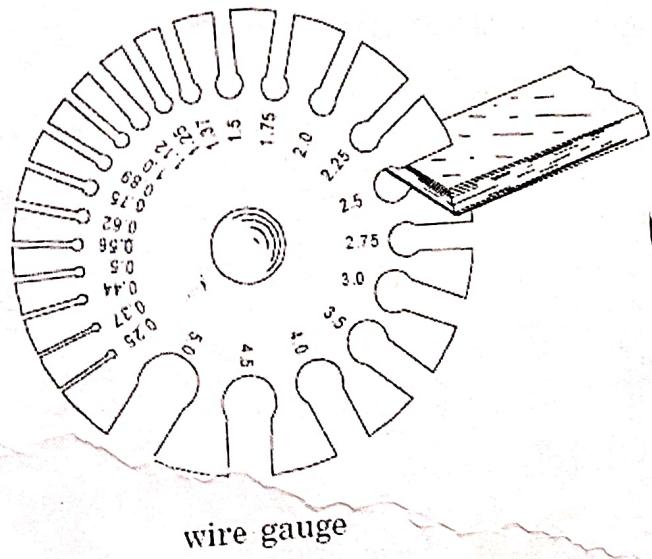


**Cross-peen hammer:** It has a square, flat face and it is tapered on one side. It is used for setting down the edges for making a double seam.



**Mallet:** Mallet is generally made of wood or plastic. It is used whenever slight blows are required. Wooden mallets do not damage the surface.

**Wire Gauge:** The thickness of sheet metal is preferred in numbers known as the standard wire gauge (SWG). The gaps in the circumference of the gauge are used to check the gauge number as shown below.



**Sheet metal joints:** Various types of joints are used in sheet metal work to suit the varying requirements. Some commonly used sheet metal joints and folded edges are shown below. These are self secured joints, formed by joining together two pieces of sheet metal and using the metal itself to form the joint.

#### SAFETY PRECAUTIONS:

Never carry tools in pockets. Do not try to hold the sheets with bare hands. Do not remove any guards on squaring shear. Care should be exercised when working on squaring shears. Be sure that the fingers are away from the shearing blade. Never use a soldering iron with a loose handle. Never touch a soldering iron to see its hotness. The safest method is to touch the iron to solder. The melting of solder indicates the correct temperature.

1. Be careful when cutting out a pattern. Remove scrap metal to avoid injuries.

**EXPERIMENT NO. T2:**

**AIM:** To prepare an SQUARE TIN from the sheet metal as per given dimensions.

**MATERIALS REQUIRED:** Two GI sheets of size ~~150 mm X 100mm.~~ <sup>175</sup> <sup>175</sup> <sub>40</sub>

**TOOLS REQUIRED:**

1. Scriber	2. Straight snip	3. Curved snip
4. Beak horn stake	5. Hatchet stake	6. Steel rule 12"
7. Mallet	8. Soldering iron	

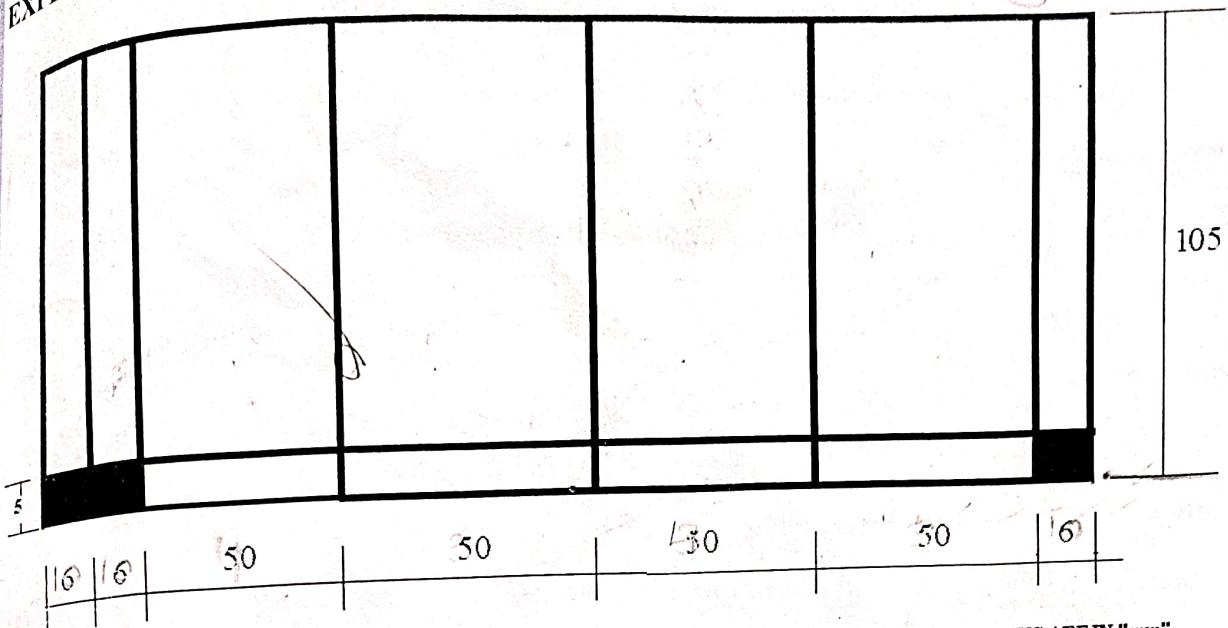
**PROCEDURE:**

1. In order to obtain correct size and shape of the article, prepare template.
2. The template is drawn directly on the material.
3. The sheet is cut with the help of snip and the notching operation is carried out to obtain the desired shape.
4. The sheet metal is bent along the marked lines by striking with a mallet on proper stake.
5. The edges of the sheet metal is folded to strengthen the edge and to eliminate the sharp edges.
6. Repeat the above procedure to get the similar pipe.
7. Solder the two pipes to get the required L-pipe joint.

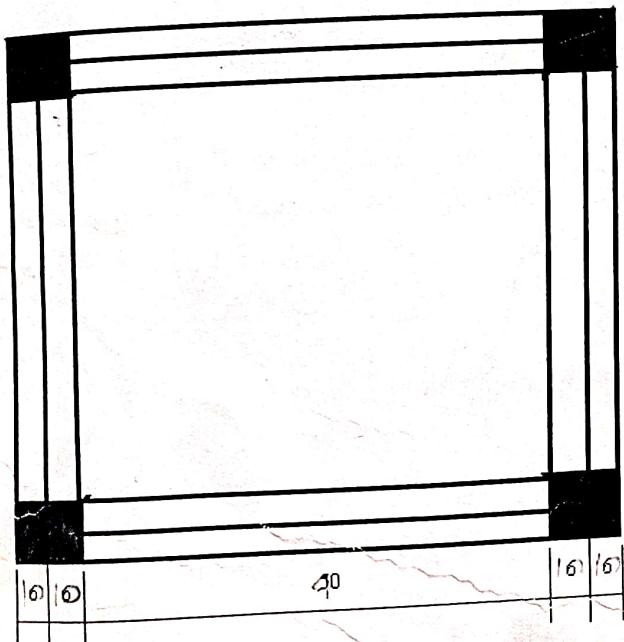
**PRECAUTIONS:**

1. Never carry tools in pockets.
2. Do not try to hold sheet with bare hands.
3. Remove scrap metal to avoid injuries.

**RESULTS:**

**EXPERIMENT DIAGRAM:**

ALL DIMENSIONS ARE IN "mm"



## Experiment

Aim! To prepare a rectangular tin from sheet metal as per given dimensions

Metal Required ! GI sheet of size 175mm x 150mm

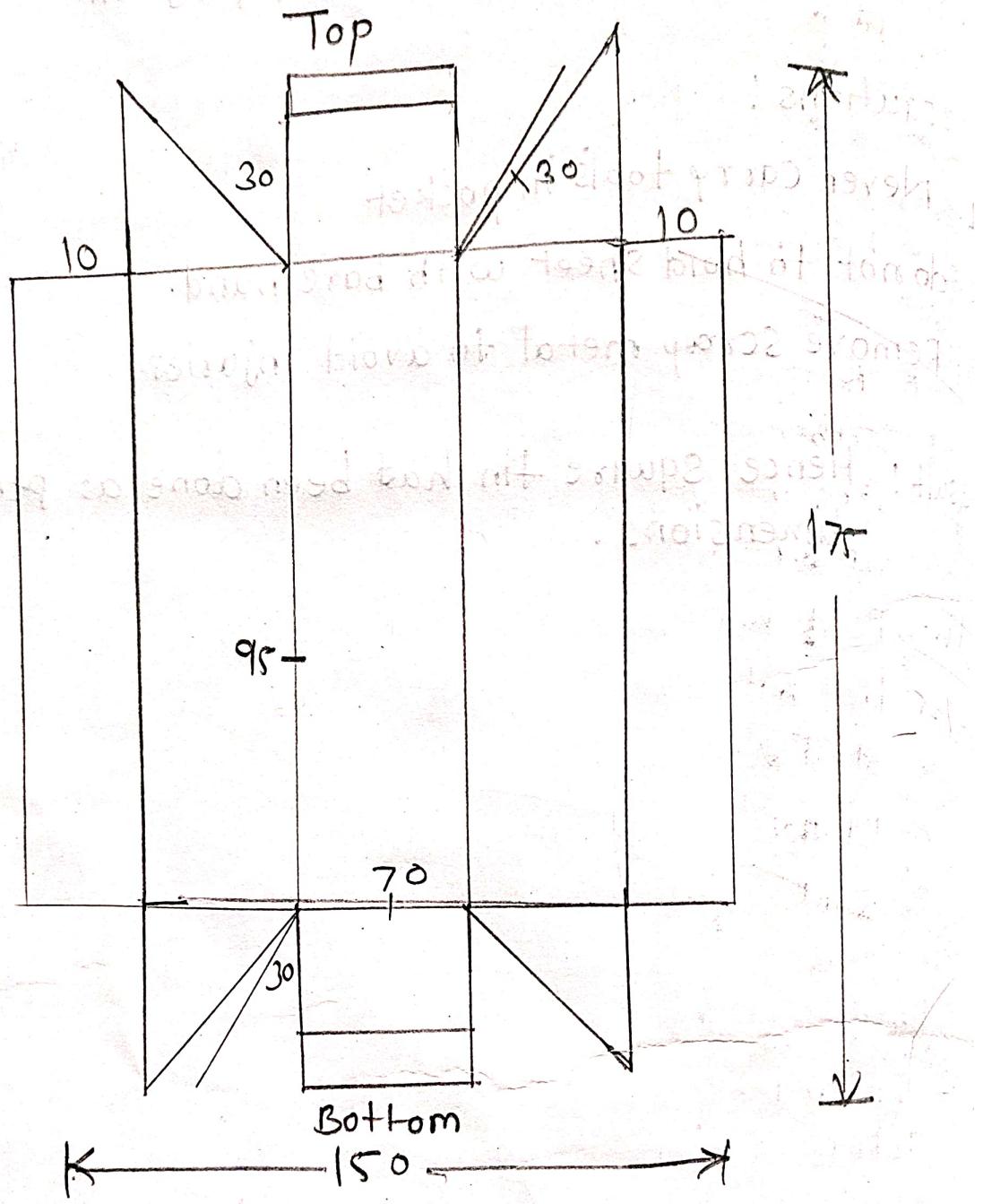
Tools Required :

- 1. scriber
- 2. straight strip
- 3. Break horn stake
- 4. Hatchet stake
- 5. Steel Rule 12"
- 6. mallet.

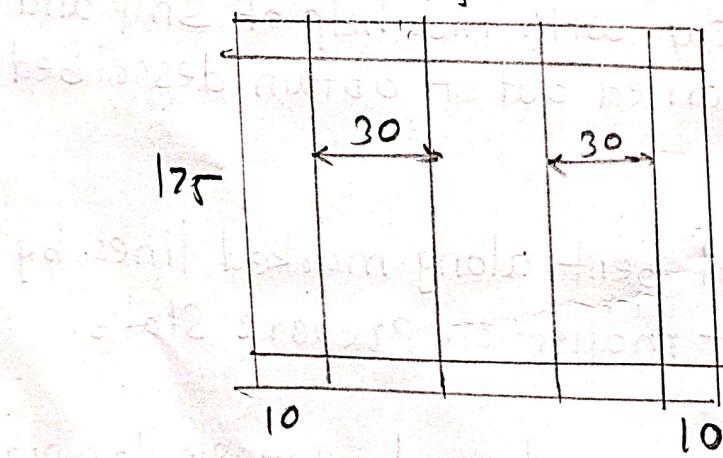
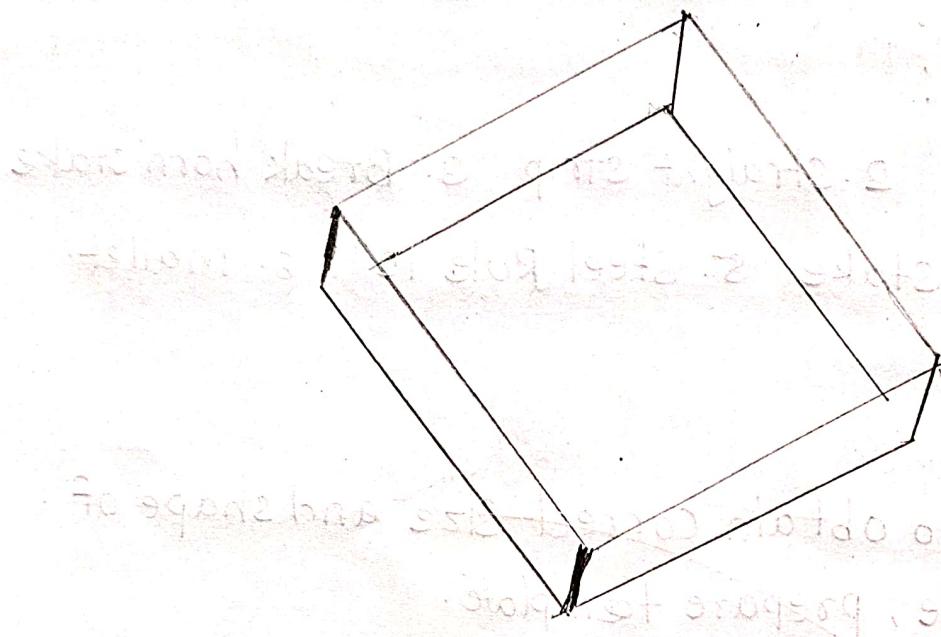
Procedure :

1. In order to obtain correct size and shape of their article, prepare template.
2. The template drawn directly on metal
3. The sheet is cut with the help of snip and notch operation is carried out to obtain described shape.
4. The sheet metal bent along marked lines by taking without mallet on prepare Stake.
5. repeat above procedure to get similar pipe.
6. Solder the pipe to required L-pipe joint.





## EXERCISE



Date.....

Page No.....

### Precautions:

1. Never Carry tools in pocket.
2. do not hold sheet with bare hand

Result! Hence Rectangular tin is ~~proved~~ <sup>Has been done</sup> as per the given dimensions