Assignment-3

Date 12/01/22
Page No.
Shivalal

"BLACKSMITHY"

Introduction :-

Blacksmithy or hand forging is an ancient trade. It Consist of heating a metal stock till it aquires sufficient plasticity, followed by hand-forging involving hammering, bending, prepping etc. till the desired shape is attained.

Hand forging is the term used when the process is Carried out by hand tools.

Machine forging is the term used when the process is Carried out by machines / power operated machines.

Forging is used for producing small articles for which accuracy is not so Important. The shop in which forging operations are Carried out is known as smithy shop.

The following are the advantages of forging :-

1) Strength and Toughness is high.
2) Strength to weight ratio is high.
3) Internal defects are eliminated.
4) Forged parts need less or no machining.

Tools and Equipments :-

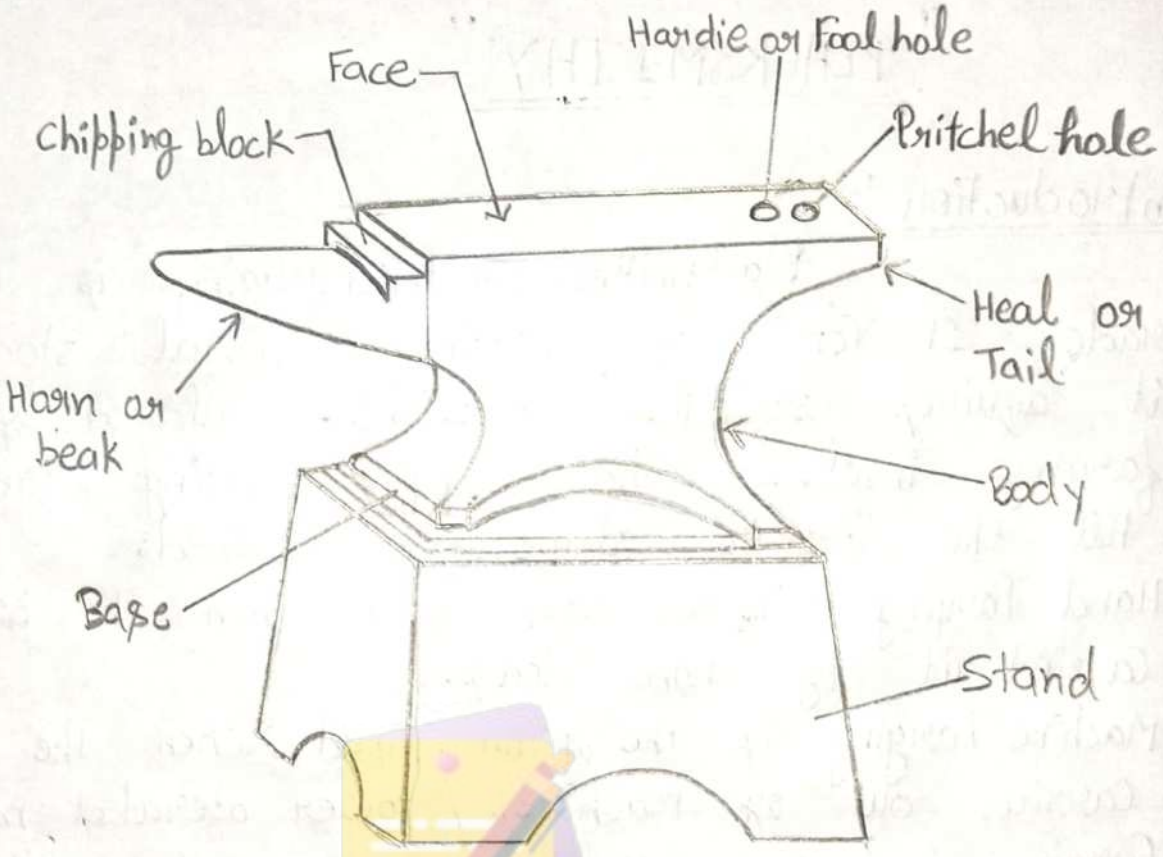
① **Forge OR Hearth :-** A hearth is used to heat the metal to be shaped. Hearths are used for heating small jobs to be forged by hands. Gas, oil or Coal firing may be used for the purpose. The required air for fire is supplied under pressure by blower through the pipe in to the hearth.

Metal	Forging Temperature, °C
Mild steel	750 – 1300
Wrought Iron	700 – 1300
Medium carbon steel	750 – 1850
High carbon and alloy steel	800 – 1150

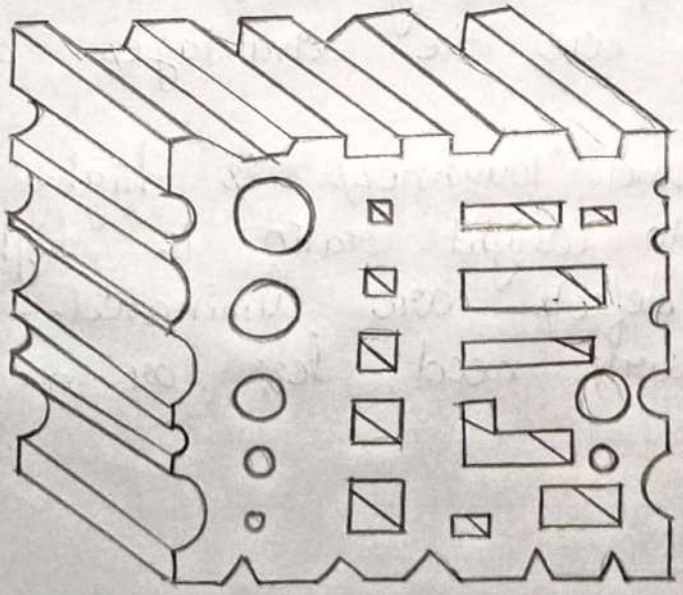
② **Anvil :-** It is a supporting Tool. It is useful for operations like bending, swaging etc. Its body is made of Cast steel, wrought Iron or mild steel with a hardend Top layer. Anvils are made in size weighting from 85 kg to 850 kg. An anvil of 75 kg is suitable for General purpose.

③ **Swage Block :-** It is also a supporting Tool. It has a number of slots of different shapes and sizes. It is used to support while swaging different shapes. It is generally made up of Cast Iron or steel.

Tools And Equipments :-



Anvil



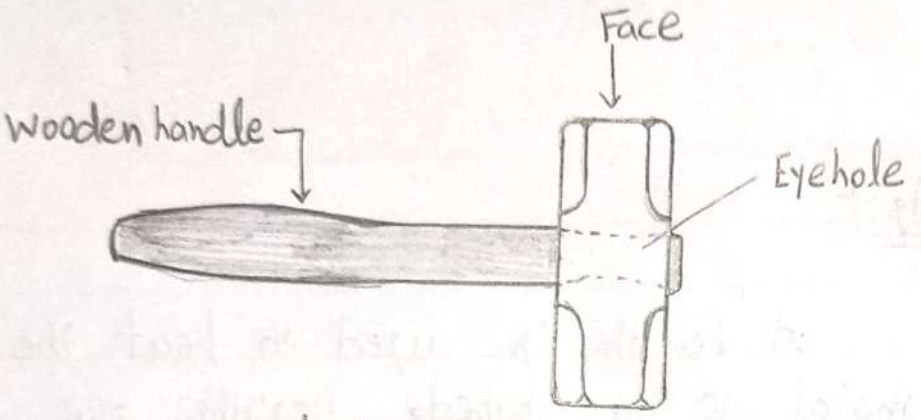
Swage Block

④ Hammers :- Hammers are of different types and weights. The ball-peen hammer used for light forging work.
The sledge hammers are used for heavy work.

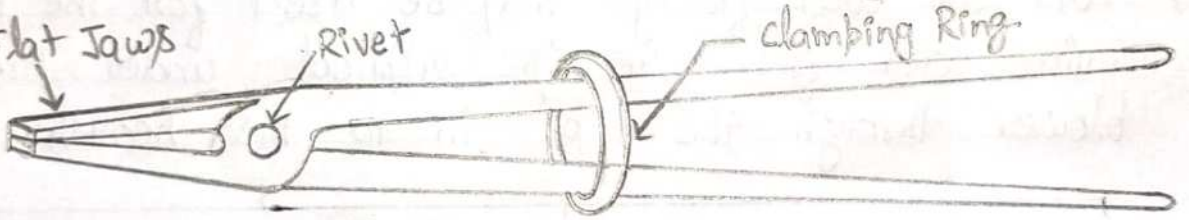
⑤ Tongs :- It is a holding device. They are made up of mild steel.
(i) Flat Tong :- used for holding rectangular section
(ii) Round Tong :- used for holding round rods.
(iii) Square Tong :- used for holding square rod.

⑥ Flattener :- A flatter of small size is known as set hammer. Flatter is a tool made with a perfectly flat face.

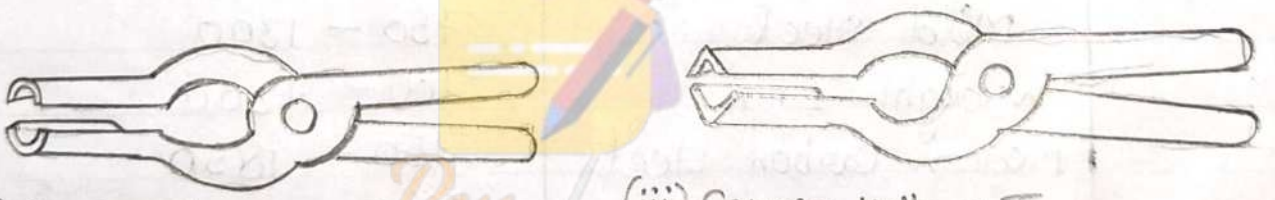
⑦ Chisel :- Chisel is used to cut metal either in hot or cold state.
(i) Cold chisel :- It is similar to fitter's chisel except it is longer and has a handle
(ii) Hot chisel :- It is used for cutting hot metals and its cutting edge is long and slender.
Chisels are made of toolsteel, hardened and tempered.



Sledge Hammer

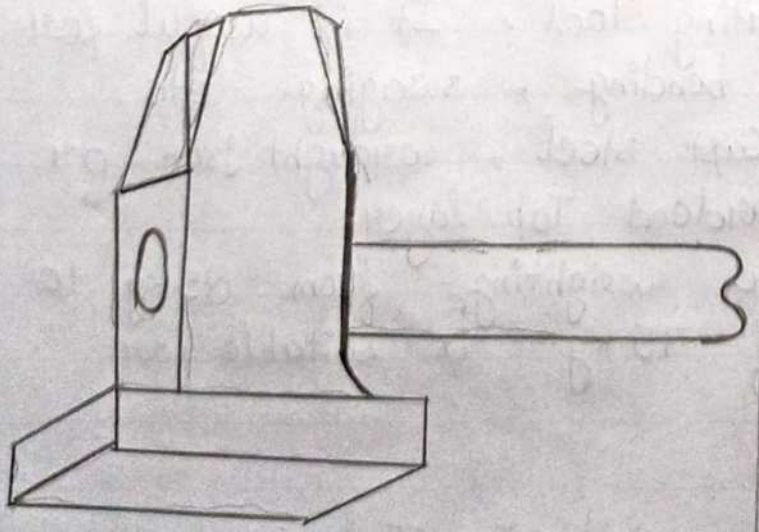


(i) Flat Tong



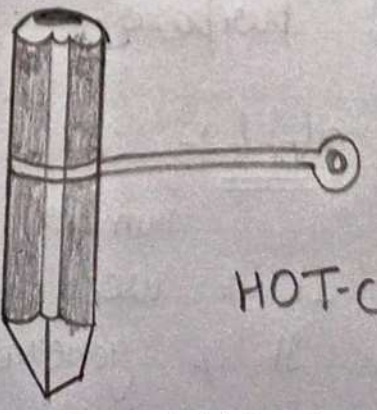
(ii) Round Hollow Tong

(iii) Square Hollow Tong



Flattener

= Cold chisel



HOT-chisel

Forging operations :-

① **Drawing - Down :-** Drawing is the process of streching the stock while reducing its Cross-section locally.
Example → Forging the tapered end of a cold chisel.

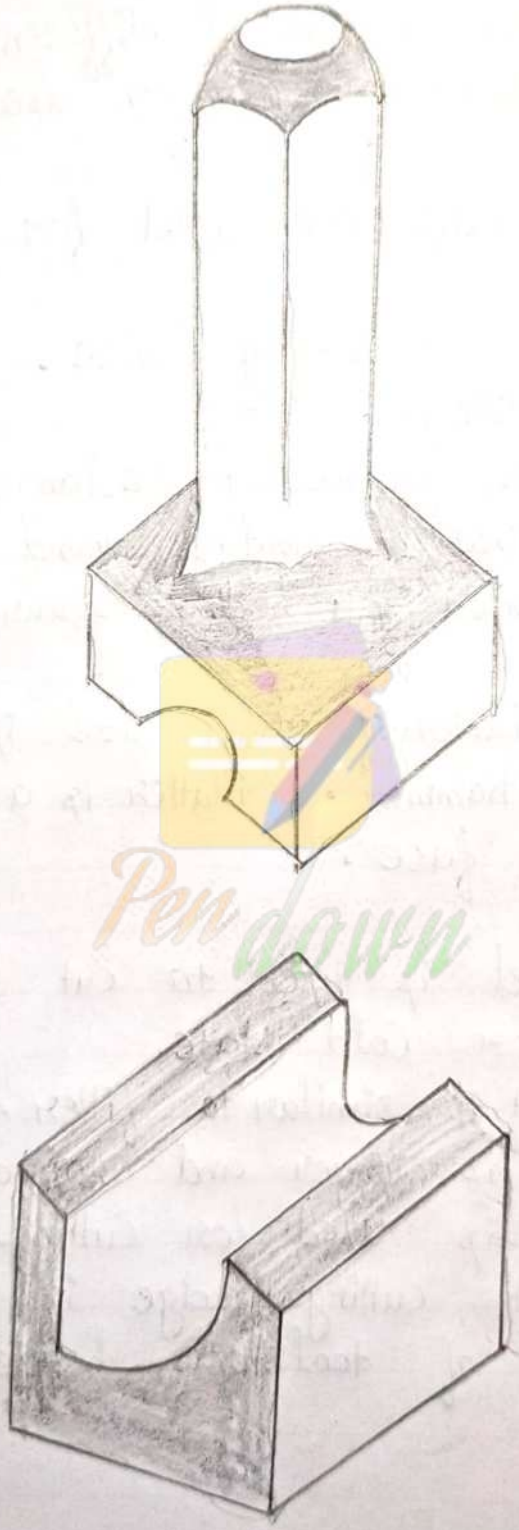
② **Upsetting :-** It is the process of increasing the area of Cross-section of a metal piece, with Corresponding reduction in length.

③ **Fullering :-** Fullers are used for necking down a piece of work. Fullers are made of high Carbon steel into two parts, called the top and bottom Fullers.

④ **Flattening :-** This process is used to flat the surface or finishing flat surface by using Flatters.

⑤ **Swaging :-** Swages are made of high Carbon steel and and are made in two parts Called top and bottom Swages. These are used to reduce and finish to round, square or hexagonal forms.

⑥ **Bending :-** Bending of bars, flats etc is done to produce different bendshapes may be made on anvil.



Set of Swages

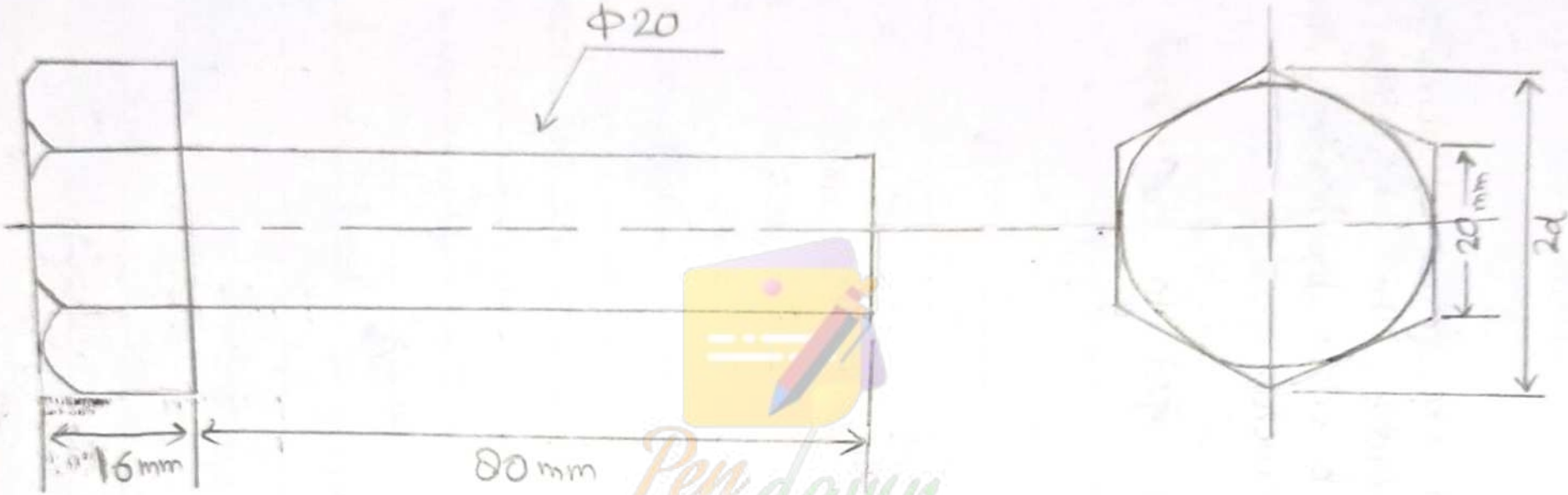
⑦ Twisting :- It is also one form of bending. it is done to increase the rigidity of the work piece. It can be done by heating and then applying a turning moment.

⑧ Cutting :- Chisels are used to cut metal.

Safe Practices :-

① Hold the hot work downwards close to the ground, while transferring from hearth to anvil, to minimize danger of burns; resulting from accidental collisions with others.
② Use correct size and type of Tongs to fit the work
③ care should be taken in the use of hammer.
④ wear face shield when hammering hot metal.
⑤ wear gloves when handling hot metal.
⑥ wear proper safety shoes.
⑦ Ensure that hammers are fitted with tight and wedged handles.

"Hexagonal Bolt"



"MODEL"
"HEXAGONAL BOLT"

Aim :- To make a hexagonal bolt using the given cylindrical M.S. rod.

Material Required :- Cylindrical M.S rod of diameter 20mm and length 100mm and Coke for heating.

Tools Required :- Hammer, 2-Tongs, Flattener, Anvil, Forge, Brass rule.

Procedure :-

S.No	operation	Description	Tools used
1)	Heating	Collect the tools and material for model. Heat the given work piece into hearth to red hot temperature.	Forge
2)	Jumping one end of the workpiece to make bolt head.	Take the heated work piece for jumping operation on the heated end to form bolt head by hammering	Tongs, Anvil, Hammer

③	Hammering to form hexagonal head.	Repeat this operation to form the end of work piece to the required size of head. heat the head again and hammered it suddenly to form the cylindrical head of bolt.	Tongs, Anvil, hammer., Forge
④	Hammering repeatly to get hexagonal head of bolt	Again heat the cylindrical head and keeping the end on anvil and hammered it to form the hexagonal head. This is repeated to form regular hexagonal head.	Tongs, Anvil, hammer, Forge.
⑤	Finishing	Finish the hexagonal headed bolt and checked the dimensions using brass rule.	Flattener, Brass rule

Result :- The hexagonal bolt is obtained.

☆ Follow all safety Practices of blacksmithy shop. as mentioned.