JOB NO.4 B.Tech – [redacted] II

# MAKING OF A HEXAGONAL NUT

## OBJECT

Making of a hexagonal nut.

Bolt and nut belong to the category of engineering fastners. This is temporary fastening device as two parts fixed by bolt and nut can be detached as per requirement without damaging the parts.

## LIST OF TOOLS AND EQUIPMENTS REQUIRED (FOR MAKING NUT)

***i) Marking Tools and Equipments***

a) Scale b) Trisquare c) Divider d) Dot Punch e) Hammer f) Chalk pencil g) Wood pencil

***ii) Cutting Tools and Equipments***

a) Hack saw b) Flat file, 2nd cut, 10" long, Double cut. C) Tap Set withTap Wrench for 23/64 " Dia. B.S.W. Thread.

***iii) Finishing Tools and Equipments***

a) Smooth files b) Emery paper

***iv) Materials Required***

a) M.S. Plate of required thk. b) Lubricating oil c) Work holding device

## SEQUENCE OF OPERATION :-

1) Study the working diagram of the job thoroughly. Observe its diamension.

2) Prepare the list of tools and equipments required. Receive them from the engineering store, check their condition, sharpen the blunt tools, in grinding wheel if necessary.

3) Check the condition of the fitters bench vice, tighten all the loose holding bolts if there are any. Apply lubricating oil on the vice operating screw for its easy function.

4) Receive the M.S. Plate of required thickness from the engineering store, give necessary marking for hexagonal top of the nut.

5) Each side of the hexagon will be roughly equal to the radius of the circumscribing circle, by means of hack saw cut the six faces of the nut and complete the faces by means of filing. Give chamfer at an angle of 30' as shown in the figure.

6) Hold the twist drill bit of (23/64") in the drill chuck which is held in the drilling machine spindle. Give centre punch mark at the centre of the hexagonal surface of the nut and hold it in the vice of the drilling machine and drilled a hole of (23/64") . File the surface of the hexagonal faces and held it in the fitter's bench vice.

JOB NO. 5 B.Tech – [redacted] II

# MAKING OF A HEXAGONAL BOLT

## OBJECT

Making of a hexagonal headed bolt

Bolt and nut belong to the category of engineering fastners. This is temporary fastening device as two parts fixed by bolt and nut can be detached as per requirement without damaging the parts.

## LIST OF TOOLS AND EQUIPMENTS REQUIRED (FOR MAKING BOLT)

***i) Marking Tools and Equipments***

a) Scale b) Trisquare c) Divider d) Dot Punch e) Hammer f) Chalk pencil g) Wood pencil

***ii) Cutting Tools and Equipments***

a) Hack saw b) Flat file, 2nd cut, 10" long, Double cut. C) Hand Die-stock with Die Block, size of the Die = 7/16" B.S.W. Thread.

***iii) Finishing Tools and Equipments***

a) Smooth files b) Emery paper

***iv) Materials Required***

a) M.S. Stock b) Lubricating oil c) Work holding device

## SEQUENCE OF OPERATION

1) Study the working diagram of the job thoroughly. Observe its diamension.

2) Prepare the list of tools and equipments required. Receive them from the engineering store, check their condition, sharpen the blunt tools, in grinding wheel if necessary.

3) Receive the M.S. Stock from store.

4) Check the condition of the fitters bench vice, tighten all the loose holding bolts if there are any. Applly lubricating oil on the vice operating screw for its easy function.

5) Hold the M. S. stock in fitter's bench vice, give chalk marking on the circular face of the head and divided the circumference in six equal parts. The length of each chord should be approximately equal to the radius of the circle for dividing the circumference in six equal parts. Give dot punch mark at each division at each point and pined the points to form a hexagon inside the circle. Then form the hexagonal head by filling the sides of the round by 2nd cut flat file. A chamfer should be given at 30" to each corner. Hold the hexagonal partion of the stock in the vice and cut the external threads on the body by the 7/16" B.S.W. hand-die.

6) Finally, file and polish the job by smooth file and emery paper.

7) Cut the internal threads by 7/16" B.S.W. tap operating the taper tap first, next the plug tap and finally complete the thread by means of the bottoming tap.

8) Finally file and polish the job by smooth file and emery paper.

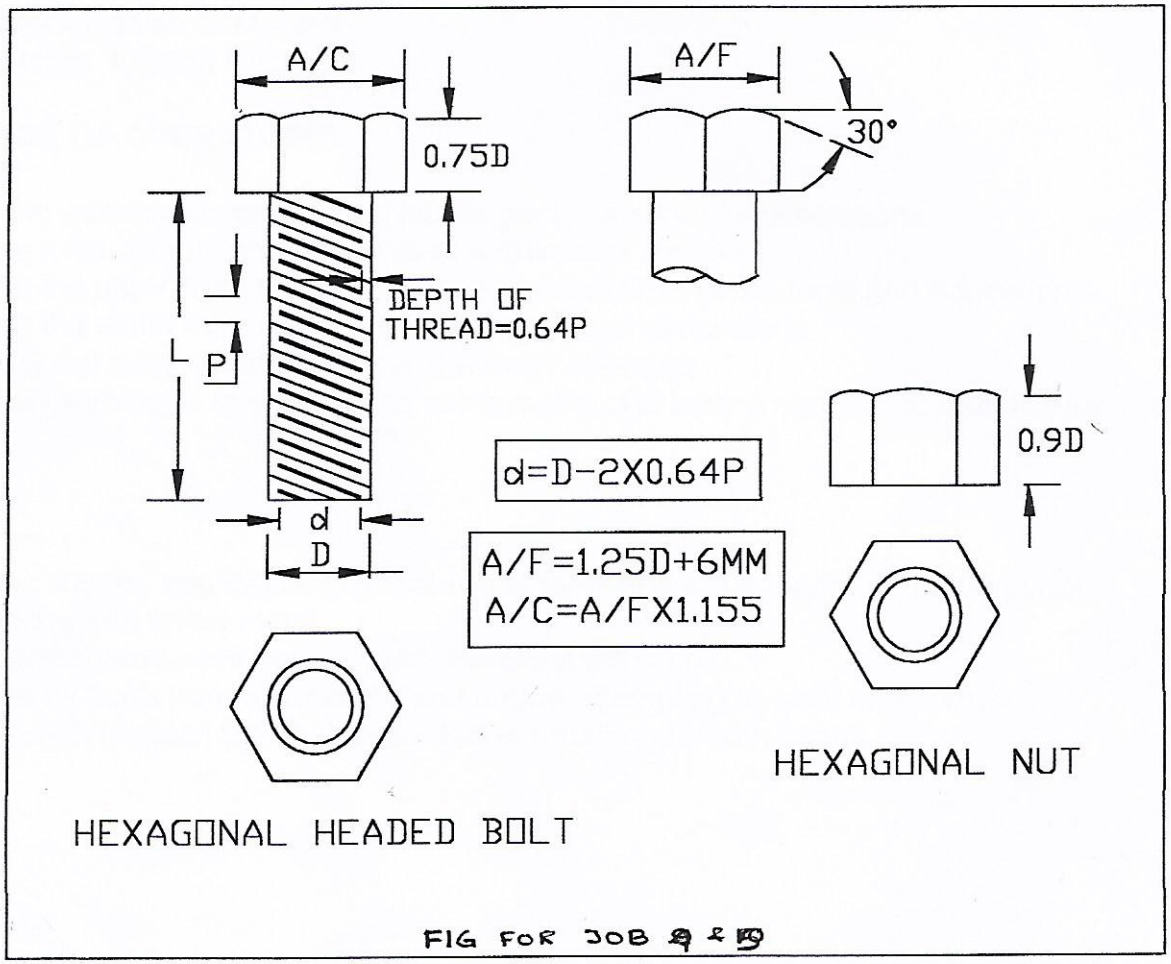



FIG FOR JOB 9 & 10

Job No – 6

B.Tech Sem - II

## SHEET METAL JOB

**OBJECT:** To make a Sheet Metal Funnel from 26G (0.4mm thick) GSS Sheets.

### LIST OF TOOLS AND EQUIPMENTS:

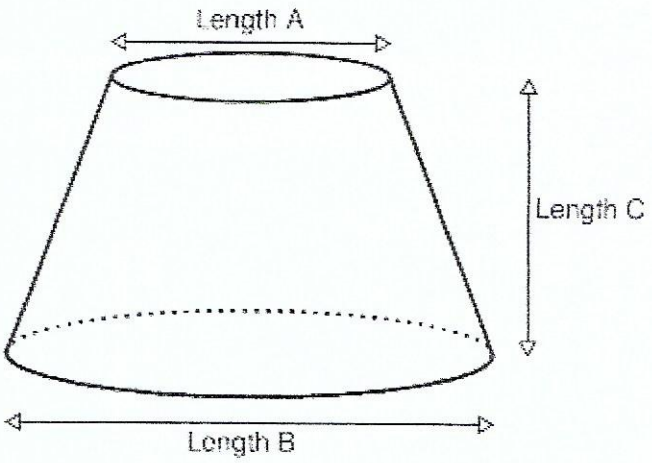
Measuring and marking tools:-1.Steel Rule. 2. Scriber. 3. Divider. 4. Dot Punch. 5. Flat Steel Square. 6. Tri Square.
Cutting tools: - 1. Hand snip 2. Tin Snip.
Blowing tools:-1. Mallet. 2. Setting Hammer.
Holding tool:- 1. Plier. 2. Mandel.
Finishing tools: 1. Sand Paper.

### SEQUENCE OF OPERATIONS:

1. Study the working diagram of the job properly. Observe its dimensions.
2. Prepare a list of tools and equipments required for the job.
3. Receive the same from the store. Check the condition of the tools and equipments.
4. Receive the sheet from store and check its overall dimensions
5. Make lay out on given sheet as per drawing / template.
5. Cut sheet with hand snip and bend using mallet and setting hammer to form the job (Funnel).

### SAFETY:

Safety precautions applicable to sheet-metal tools and equipment should be carefully maintained while working with sheet metal.
1. Sheet metal can cause serious cuts. Handle it with care.
2. Remove all burrs from the metal sheet before attempting to work on it further.
3. Use a brush to clean the work area. Never brush metal with hands.



JOB NO-9 PART-II

## JOINING TWO MS PLATES BY ARC WELDING

### INTRODUCTION

Welding is a process of joining similar metals by application of heat with or without application of pressure and addition of filler material. The result is a continuity of homogenous material of the composition and characteristics of two parts which are being joined together.

### THEORY

The term weldability has been defined as the capacity of being welded into inseparable joints having specified properties such as definite weld strength proper structure etc. weldability depends on one or more of five major factors : 1) Melting points 2) Thermal conductivity 3) Thermal expansion 4) Surface condition and 5) Changing microstructure

***Arc Welding Machine:*** Both direct and alternating current are used for electric arc welding each having its particular application. In some cases either each suitable. DC welding supply is usually obtained from generators given by electric motor or if no electricity is available by internal cumbersome engines. For AC welding supply transformers are predominantly used for almost all arc welding where main electricity supply is available. They have step down the usual supply voltage (200-400 volts) to the normal open circuits welding voltage(50-90 volts).

### LIST OF EQUIPMENTS

1. AC machine 2) Electrode 3) Electrode holder 4) Cable and Cable connector 5) Cable plug 6) Chipping hammer 7) Earthing clamps 8) Wire brush 9) Helmet 10) Safety goggles 11) Hand gloves 12) Aprons

### SEQUENCE OF OPERATIONS

I) Study the working drawing properly and observe its dimensions.

2) Prepare a list of equipments required and received the same from the engineering store. Check their conditions.

3) Receive two numbers mild steel plate from the engineering store and check their overall dimensions.

4) Hold the MS plates for welding according to the drawing.

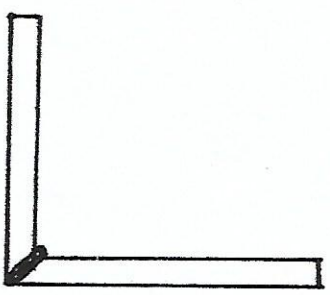
4) Switch on the transformer and fix the electrode on the electrode holder.

5) Do welding operation by wearing helmet, safety goggles, hand gloves and apron.

6) Clean the job by chipping hammer and wire brush.

**Safety precautions** : The following precautionary measures are to follow :

1) Always wear personal protective equipments.



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