EXPERIMENT NUMBER:- 2.3 OR EXP. No. 6

AIM OF THE EXPERIMENT:– To make a job to control dimensions, involving different operations like, marking, measuring, punching, hack-sawing, filing etc.

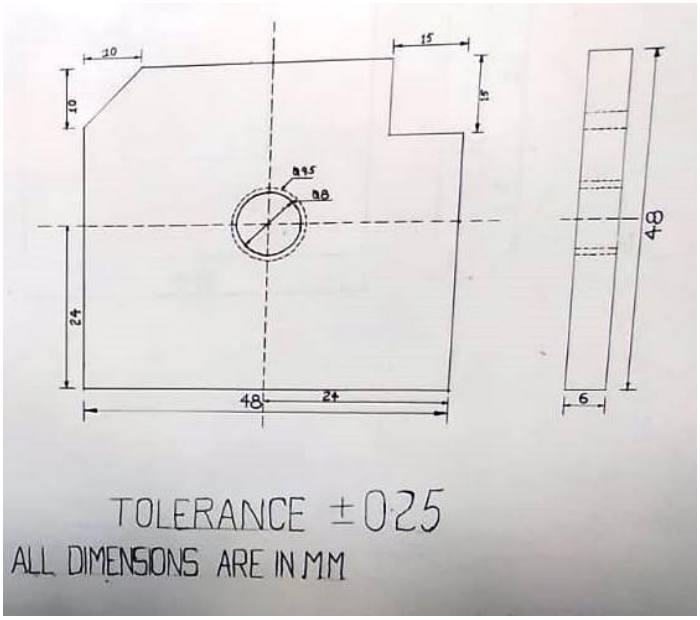
TOOLS AND EQUIPMENT USED:- File, Hand hacksaw, Bench Vice, Try Square, Surface Plate, Angle Plate, Vernier Caliper, Vernier Height Gauge, Flat File, Half Round file

MATERIAL REQUIRED:- Mild Steel flat 50x50x6 mm.

PROCEDURE:–

1. Cut a work piece of 50x50mmfrom the given flat using Hand hacksaw.
2. Hold it in Bench Vice and file two adjacent sides. Check that these two sides are at right angle.
3. Mark for dimensions 48x48mm, using a height gauge, taking the two filed sides as reference.
4. Use prick punch to firm up the marking lines.
5. File all the four sides to the size 48x48mm and check for the square-ness of the sides.
6. De burr all the sharp corners.
7. Do marking for the inclined cutting, square cutting and the tapped hole using Height Gauge.
8. Drill a tap hole of size 8mm using the Bench Drilling Machine.
9. Do tapping in the hole using a tap of size (3/8’’).
10. Deburr and finish using a second cut file.

PHOTOGRAPHS TO **BE ATTACHED**:-



PHOTOGRAPH 1

Safety Precautions:-

1. Always wear the Apron and closed shoes in the Shop.
2. Do not drop metal pieces on Surface Plate.
3. While Tapping, do not apply excessive force, it may break the Tap.
4. Do not drop metal pieces on Surface Plate.

EXPERIMENT NUMBER:- 2.4 or Exp. No. 7

AIM OF THE EXPERIMENT:– To make different sheet metal joints.

TOOLS AND EQUIPMENT USED:- Flat Steel plate, Hand Shears, Steel Rule, Steel Square, Scriber, Mallet, Soft Face Hammer, Try square, and Stakes.

MATERIAL REQUIRED:- G.I. sheet of 28 SWG

THEORY:- Common joints in the sheet metal work are:

Hem Joint is wired edge, cup and angular enables the edges to join the pieces along them.

Seam joint is a very commonly used one and most widely used methods for joining light and medium gauge sheet metal. It consists of two folded edges that are locked together with a hand groover.

Locked Seam Joint: the simple/ single seam joint is locked so as to ensure a positive grip and to make the joint flush with the surface.

A lap joint is very frequently used and the parts can be secured by means of soldering or riveting. A lap joint involves placing one piece of sheet metal over another, "lapping" it. Lap joints are among the strongest joints available.

Wired Edge Joint is often specified in the plans, Objects, such as ice-cube trays, funnels, garbage pails, and other articles, formed from sheet metal are fabricated with wire edges to strengthen and stiffen the jobs and to eliminate sharp edges.

The formula for a wired edge = 1½ x diameter of wire - 1mm or 2mm metal thickness (approximately)

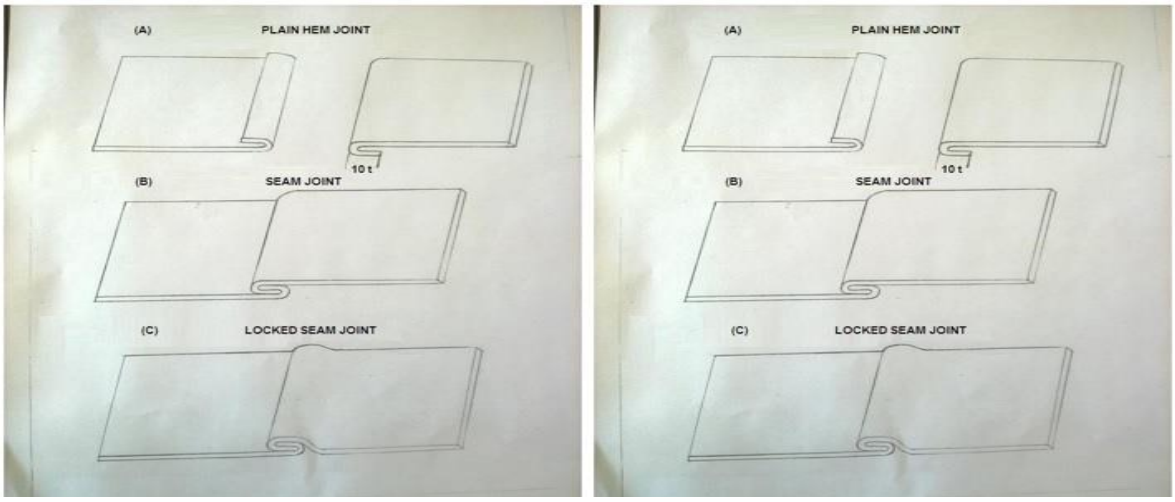
PROCEDURE:–

1. Mark G.I. sheet to the size 75 * 180 mm with the help of Scriber and steel rule.
2. Cut the sheet in above mentioned size with the help of straight snip. With the help of mallet and flat stake or rail, make sheet straight if there is any bend in it.
3. Do marking with the help of scriber at a distance of 10 mm, 20 mm, 90 mm, 160 mm, 170mm vertically from left end of the sheet.
4. Do marking with the help of scriber at a distance of 15 mm, 30 mm, 45 mm, 60 mm horizontally from top end of the sheet.
5. Cut the sheet with straight snip into two equal halves vertically i.e. at 90 mm marking.
6. Using hollow punch, make holes for rivets where horizontal and vertical markings met each other.
7. Join the holes by keeping first half of sheet on second half of sheet in overlapping condition.
8. Put the rivets through the holes.
9. Use Rivetting hammer to flat the free end of each rivet till rivets tighten on the sheets.
10. To remove sharp edges, cut all the four corners.
11. Bend one sharp side by placing it on rail and hammering with the help of mallet to make hem joint.
12. Roll the other sharp side slowly during soft hammering using mallet to make wired edge hem joint.

Safety Precautions:-

1. Handle the freshly cut pieces carefully as sharp sheet edges can cause serious cuts.
2. Sharp waste cutting lying on the floor can pierce shoes to cause injuries.
3. See that sharp sheet metal pieces do not hurt others working nearby.

PHOTOGRAPHS TO BE ATTACHED:-



PHOTOGRAPH 1

EXPERIMENT NUMBER:- 3.1
OR EXPERIMENT NUMBER:- 8

AIM OF THE EXPERIMENT:– To make a House wiring Circuit.

TOOLS AND EQUIPMENT USED:- Neon Tester and Screw driver Set.

MATERIAL REQUIRED:- Energy meter, main switch, MCB, one way regulator, lamp holder, two pin socket, fan regulator and supply indicator etc.

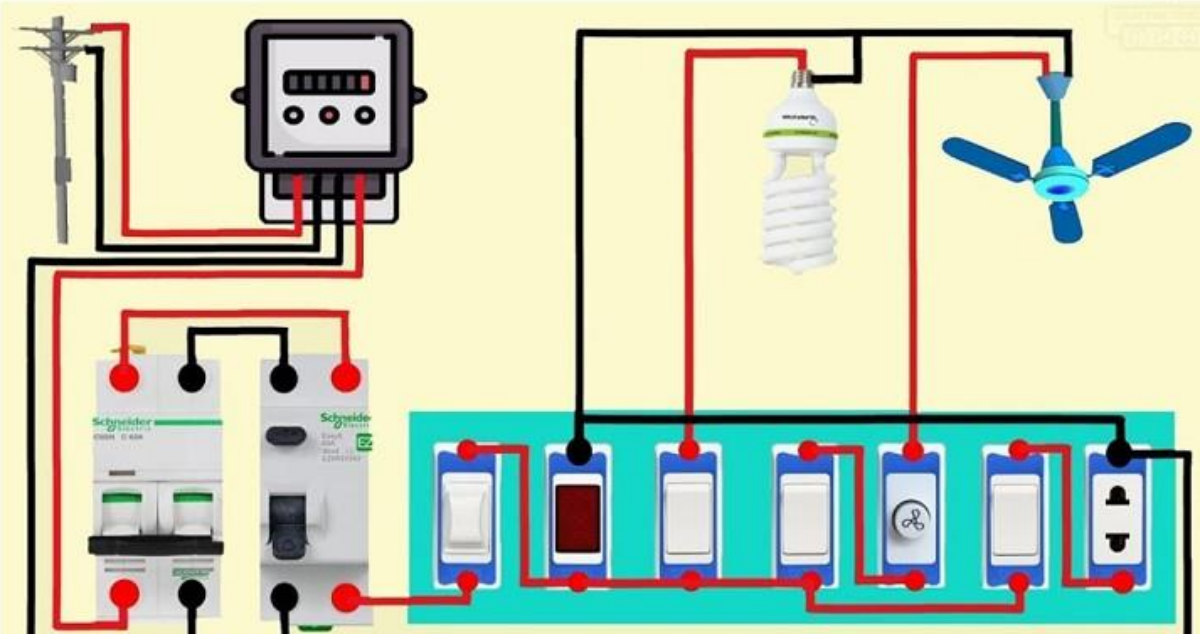
PROCEDURE:–

1. All the accessories have been fixed over the practice board.
2. The students have to make the required the required circuit as shown in the figure.
3. The red line in the figure shows the live wire, and black the neutral wire.
4. Strip wire ends properly to remove plastic completely.
5. Tighten wires correctly for secure connectivity.
6. Please show the circuit connections to the shop instructor before switching on.

Safety Precautions:-

1. Take care that stripped wires can prick finger tips.
2. No wire should have loose end free.
3. Must take every precaution possible to avoid electric shock.
4. Always wear closed rubber sole shoes in the shop.
5. Working area must be clean and dry.

PHOTOGRAPHS TO BE ATTACHED:-



EXPERIMENT NUMBER:- 3.2

OR EXPERIMENT NUMBER:- 9

AIM OF THE EXPERIMENT:– To make a Full Wave Center Tap Rectifier.

TOOLS AND EQUIPMENT USED:- Soldering Iron 25w, Solder Wire, Soldering Flux, Neon Tester, Screw Driver Set and Twizzer.

MATERIAL REQUIRED:- Centre Tap Transformer 240/6-0-6 V, Diode In 4007, Transistor 7805, Resistance 1kΩ, Capictor 1000µF, LED 3V, Circuit Board 5x3 cm and Jumper Wire.

THEORY:-

In full wave rectification, when AC supply is applied at the input, during both the half cycles (i.e. positive as well as negative) current flows through the load in the same direction. This can be achieved by using at least two crystal diodes, conducting current alternatively. A transformer with secondary winding AB tapped at the center point C. **The two diodes D_1 and D_2 are connected in the circuit so that each one of them uses one half cycle of input AC voltage. The diode D_1 utilizes the AC voltage appearing across the upper half (AC) of secondary winding for rectification while D_2 user the lower half (CB) of secondary winding.**

Operation: When AC supply is switched on, the alternating voltage (V) appears across the terminals AB of secondary winding of transformer. During positive half-cycle at secondary voltage, the end A become positive and end B negative. **This makes the diode D_1 forward biased and diode D_2 reverse biased. Therefore, diode D_1 conducts while diode D_2 does not. Thus, current (i) flows through diode D_1, load resistor R_L and the upper half of secondary bold arrow head. During negative half cycle, the end B becomes positive and end A becomes negative. This makes diode D_2 forward biased and diode D_1 reverse biased. Therefore, diode D_2 conducts while diode D_1 does not. Thus current (i) flows through diode D_2, load resistor R_L and the lower half of the secondary winding. It may be seen that the current flows through the load resistor R_L in the same direction (i.e. from M to L) during positive as well as negative half of input AC voltage. Therefore, DC output is obtained across the load resistor R_L.**

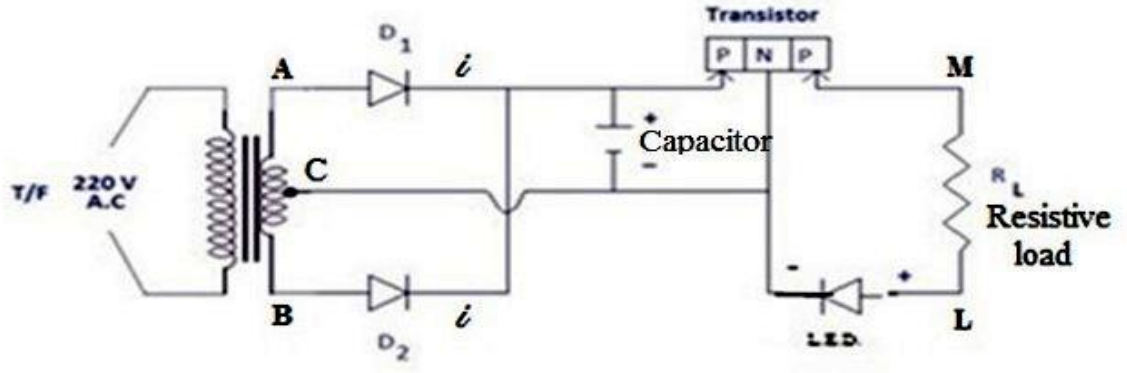
PROCEDURE:–

1. Take Circuit Board and all components required.
2. Install components as per the circuit diagram.
3. Solder the components by Soldering Iron.
4. Check the circuit continuity by Multimeter.
5. Install LED and Solder it.
6. Connect the assembly to the 220v supply.
7. LED glow indicates the output of Direct current.
8. If LED glows our job is successfully completed.

Safety Precautions:-

1. Clean components before Soldering.
2. Solder carefully to avoid dry Soldering.

PHOTOGRAPHS TO BE ATTACHED:- :-



PHOTOGRAPH 1

EXPERIMENT NUMBER:- 3.3

OR EXPERIMENT NUMBER:- 10

AIM OF THE EXPERIMENT:– To make a job, involving Facing, Plain turning, Step turning & Chamfering on a Center Lathe machine.

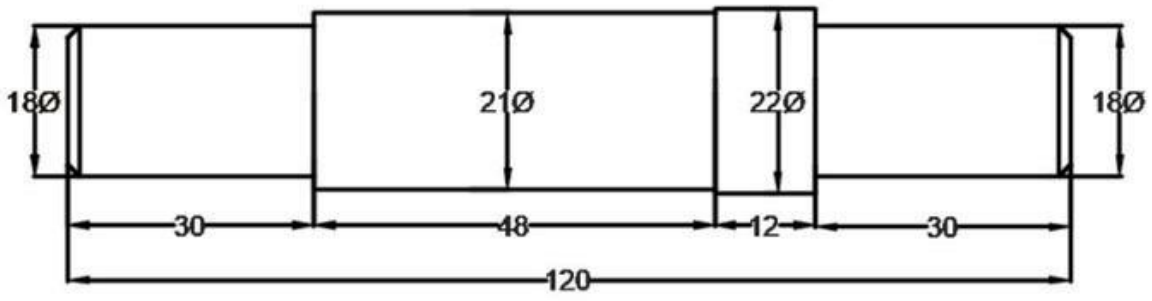
TOOLS AND EQUIPMENT USED:- Center Lathe, Turning Tool, Grooving Tool, Steel Rule &Vernier Caliper etc.

MATERIAL REQUIRED:- Mild Steel bar Ø 25 x 125 mm.

PROCEDURE:–

1. Hold the bar in 3 jaw chuck in a way that at least 20 mm of bar stock is projected outside the chuck.
2. Do facing of both the ends of bar and maintain dimension 120 mm.
3. Hold the turning tool in Tool post so that it projects out of the tool post about 25 mm. The cutting edge of the tool should coincide with the center of work piece.
4. Hold the job in a 3 jaw chuck, about 45 mm of the job projecting out. The Ø22 mm is obtained first taking one or more rough cuts then finally a finishing cut of not more than 0.50 mm depth is taken.
5. Similarly turn Ø18 mm to a length of 30 mm from the free end.
6. Chamfer the free end.
7. Remove job from the Chuck and hold from Ø18 mm resting against Ø22 mm shoulder.
8. Reduce and finish Ø25 mm to Ø21 mm up to length 78 mm from end by plain turning.
9. Turn Ø18 mm up to length 30 mm as explained above.
10. Do Chamfering on the free end at the same setting.
11. De burr all over and remove job from the Chuck.

PHOTOGRAPH TO BE ATTACHED:-



PHOTOGRAPH 1

Tolerance on length and diameter ± 0.5 and 0.1 mm respectively.

Safety Precautions:-

1. Always wear lab coat in the machine shop, avoid wear loose clothing.
2. Long loose hair have history of causing fatal accidents on lathes.
3. Wear closed shoes with rubber sole, hot chips can cause burns.
4. Never touch moving parts like Chuck, Belt or rotating grinding wheels etc.

LEARNING OUTCOMES:-

CO Number	After completion of the course the students may be able to:	Level
CO1	The students should be able to work with various tools and equipment in the workshop safely all by themselves.	Remember & Understand
CO2	The students should have practical knowledge to be able to perform basic operations, to prepare an accurate job.	Understand
CO3	The students should have learnt the use of applications and processes in our routine life.	Understand
CO4	The students should have developed a mind set for safe working and to be always on lookout for safety hazards.	Understand
CO5	The students should have gained basic knowledge about the various processes and operations performed in different shops.	Understand

CO Number	After completion of the course the students may be able to:	Level
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