

A LABORATORY MANUAL ON WORKSHOP PRACTICE – II (PR- 3)

**In accordance to syllabus (2019-20)
By S.C.T.E & V.T, Odisha**

Semester – 3rd

DEPARTMENT OF MECHANICAL ENGINEERING



GOVERNMENT POLYTECHNIC, JAJPUR

ODISHA – 755019

Affiliated to S.C.T.E & V.T, Odisha and A.I.C.T.E,

New Delhi

List of Industry Relevant Skills

The following industry relevant skills of the competency **will be gained from different types of shops like fitting ,smithy ,carpentry, welding for engineering applications'** are expected to be developed in you by undertaking the practices of this workshop manual.

1. Applicable in various industries like oil, gas, steel, construction, Heavy machineries sectors like carpentry applicable for packaging of goods and transportation
2. fittings works applicable for different child part processes by using different machine and their operational parameters.
3. Basic smith works applicable in heat treatments shops and forged industries.
4. Basic Welding engineering application used in different piping used in oil and gas sectors as well as Construction industries.

Practical-Course Outcome Matrix

Course Outcomes: CO1: Understanding the tools, equipment & Instruments used in the practices CO2: Realize the time and resource utilization in the practices CO3: Understanding the Different joints in Welding and carpentry. CO4: Standard Operational procedure of lathe machine, drilling, welding machine & Basic smithy practices. CO5: Understanding different safety and associated Hazards during work.						
S.no	Practical Outcome	CO1	CO2	CO3	CO4	CO5
1	Preparation of caliper	✓	✓	-	-	✓
2	Preparation of try square	✓	✓	-	✓	✓
3	Preparation of hammer, square , Hexagonal	✓	✓	-	✓	✓
4	Preparation of door ring with hook	✓	✓	-	✓	✓
5	Preparation of hexagonal head bolt	✓	✓		✓	✓
6	Preparation of octagonal flat chisel	✓	✓	-	✓	✓
7	Cutting of slot, botch, mortise and Tenos Joint	✓	✓	✓	-	✓
8	Preparation of single dove tail joint	✓	✓	✓	-	✓
9	Lap & Butt Joint using Arc Welding	✓	✓	✓	-	✓
10	Lap Joint using Gas Welding	✓	✓	✓	-	✓
11	Joining Two non-ferrous parts through	✓	✓	✓	-	✓

GUIDELINES TO TEACHERS

1. Teacher need to ensure that a dated log book for the whole semester, apart from the laboratory manual is maintained by every student which s/he has to submit for assessment to the teacher in the next practical session.
2. There will be two sheets of blank pages after every practical for the student to report other matters(if any), which is not mentioned in the printed practicals.
3. For difficult practicals if required, teacher could provide the demonstration of the practical emphasizing of the skills which the student should achieve.
4. Teachers should give opportunity to students for hands-on after the demonstration.
5. Assess the skill achievement of the students and COs of each unit.
6. One or two questions ought to be added in each practical for different batches. For this teachers can maintain various practical related question bank for each course.
7. If some repetitive information like data sheet, use of software tools etc. has to be provided for effective attainment of practical outcomes, they can be incorporated in Appendix.
8. For effective implementation and attainment of practical outcomes, teacher ought to ensure that in the beginning itself of each practical, students must read through the complete write-up of that practical sheet.
9. During practical, ensure that each student gets chance and takes active part in taking observations/ readings and performing practical.
10. Teacher ought to assess the performance of students continuously according to the MSBTE guidelines.

INSTRUCTIONS FOR STUDENTS

1. For incidental writing on the day of each practical session every student should maintain a dated log book for the whole semester, apart from this laboratory manual which s/he has to submit for assessment to the teacher in the next practical session.
2. For effective implementation and attainment of practical outcomes, in the beginning itself of each practical, students need to read through the complete write-up including the practical related questions and assessment scheme of that practical sheet.
3. Student ought to refer the data books, IS codes, Safety norms, Electricity act/rules, Technical manuals, etc.
4. Student should not hesitate to ask any difficulties they face during the conduct of practical.

CONTENTS PAGE

Sl. no	Practical Outcome	Page No:	Date of performance	Date of submission	Signature	Remarks
1	Preparation of caliper					
2	Preparation of try square					
3	Preparation of hammer, square , Hexagonal					
4	Preparation of door ring with hook					
5	Preparation of hexagonal head bolt					
6	Preparation of octagonal flat chisel					
7	Cutting of slot, botch, mortise and Tenon Joint					
8	Preparation of single dove tail joint					
9	Lap & Butt Joint using Arc Welding					
10	Lap Joint using Gas Welding					
11	Joining Two non-ferrous parts through					

Experiment No- 01

Aim of the experiment:

To prepare a calliper.

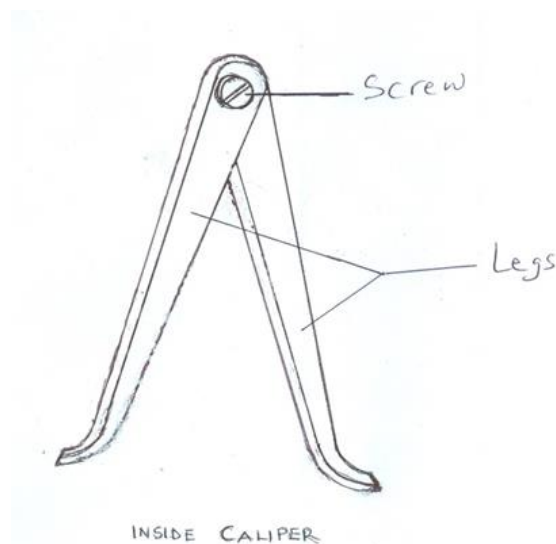
Apparatus required :

Sl. no	Name of the items	Specification	Quantity
01	Hacksaw frame with blade	300mm	01
02	Bastard File	300mm	01
03	Smooth File	250mm	01
04	Hammer	0.25Kg	01
05	Punch	150mm	01
06	Steel Rule	300mm	01
07	Drill Bit	Ø6mm	01
08	Marking Media		As per requirement
09	Drilling Machine	Bench Type	01

Raw material required:

Sl no	Name of the items	Specification	Quantity
01	M.S. Flat	2 (160X20X6)mm	02
02	M.S. Rivet	Ø6mmX10mm	01

Procedure:



(Take the according to suitable dimension)

- File the two adjacent edges of the M.S Flat to right angle.
- Apply the marking media to mark the job as per sketch and punch the marking line.
- Remove the extra material by sawing and chipping and then file the job

to the required shape.

- Drill the holes on the two pieces and clean the burrs.
- Assemble the two parts by riveting.
- Finish all sides, edges and surfaces properly.

Safety precautions :

- a. It is necessary that there is no play in its beam and movable jaw and it could be easily
- b. After long use, the jaw-edges wear out. In such cases, it should be regrinded.
- c. A job fixed on a machine in operation should not be Scale measured with it.
- d. It should always be kept away from the cutting tools.
- e. It is difficult to see the part of scale. Therefore, it is advisable to use a magnifying glass.
- f. After using it, we should clean it with thinner and keep it in the case.

Conclusion:

Hence the outside calliper is made and required dimension has prepared.

Resources used (with major specifications)

Sl no.	Name of the apparatus	Specification	Quantity
01			
02			
03			
04			
05			
06			
07			

Actual procedure followed:**Precautions followed:****Observations:****Results:**

Interpretation of results:

Conclusions and recommendations if any:

Practical related questions:

1. Which Materials required for preparation of calliper?
2. What are the measuring instruments used during preparation of caliper?
3. Which equipment can be use for both measurement and and marking?
4. Describe process of metal removal during preparation of calliper.
5. Calipers are marking tools or measuring tool?

Space for answer

Marking scheme	FOLLOW SAFETY RULES (5)	ABILITY TO FOLLOW INSTRUCTION & WORKING PROCEDURE(5)	SETUP AND EQUIPMENT CARE(5)	DIMENSIONAL ACCURACY AND SURFACE FINISH OF JOB (5)	Viva(5)	Full mark(25)
Marks obtained						

Assessment scheme:

Faculty in charge

Head of the department

Experiment No - 02

Aim of the experiment :

To prepare a Try Square.

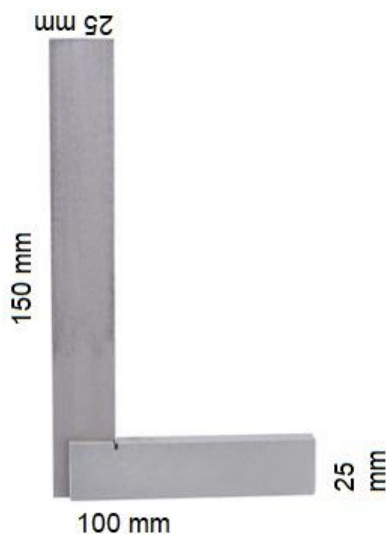
Apparatus required :

Sl. No	Name of the items	Specification	Quantity
01	Hacksaw frame with blade	300mm	01
02	Bastard File	300mm	01
03	Smooth File	250mm	01
04	Hammer	0.25Kg	01
05	Punch	150mm	01
06	Steel Rule	300mm	01
07	Drill Bit	Ø6mm	01
08	Bench Vice	125mm	01
09	Vernier Height Gauge	300mm	01
10	Try Square	150mm	01
11	Drilling Machine	Bench Type	01
12	Marking Media		As per requirement

Raw material required:

Sl. No	Name of the items	Specification	Quantity
01	M.S. Flat	(80x30)mm Beam	01
02	M.S. Flat	(130X30)mm (Blade)	01
03	M.S. Rivet-	Ø6mmX10mm	01

Procedure:



Thickness of stock – 10 mm

Thickness of blade – 3 mm

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- File the two adjacent edges of the M.S Flat to right angle.
- Apply the marking media to mark the job as per sketch and punch the marking line.
- Remove the extra material by sawing and chipping and then file the job to the required shape.
- Make small hole on each flat by drilling machine.
- File the holes on the two pieces and clean the burrs.
- Assemble the two parts by riveting.
- Finish all sides, edges and surfaces properly.

Safety precautions:

- a. We should not use try square as a hammer i.e. we should not use it to hit any job otherwise its accuracy is spoiled.
- b. Try square should be kept away from cutting tools.
- c. It should be cleaned properly before use.
- d. After making its use, it should be kept after applying grease.

Conclusion :

Finally a Try Square of required dimension has been prepared.

Resources used (with major specifications)

Sl no.	Name of the apparatus	Specification	Quantity
01			
02			
03			
04			
05			
06			
07			

Actual procedure followed:

Precautions followed:

Observations:

Results:

Interpretation of results:

Conclusions and recommendations if any:

Practical related questions:

1. What are the parts of try square?
2. What is the right process to use a try square and why we use try square?
3. What are the materials used during preparation of try square?
4. How to find out error by a try square.
5. What are the measuring instruments used?

Space for answer

Marking scheme	FOLLOW SAFETY RULES (5)	ABILITY TO FOLLOW INSTRUCTION & WORKING PROCEDURE(5)	SETUP AND EQUIPMENT CARE(5)	DIMENSIONAL ACCURACY AND SURFACE FINISH OF JOB (5)	Viva(5)	Full mark(25)
Marks obtained						

Experiment No- 03

Aim of the experiment :

To prepare a Hammer

Apparatus required :

Sl. No	Name of the items	Specification	Quantity
01	Hacksaw frame with blade	300mm	01
02	Bastard File	300mm	01
03	Smooth File	250mm	01
04	Hammer	0.25Kg	01
05	Scriber	150mm	01
06	Lathe Machine	Centre Lathe	01
07	Vernier Calliper	200mm	01
08	Bench Vice	125mm	01
09	Lathe Cutting Tool	HSS 4"	02
10	Chuck Key	-	01
11	Drilling Machine	Bench Type	01

Raw material required:

Sl no	Name of the items	Specification	Quantity
01	M.S. Rod	(Ø40X60)mm	01
02	M.S.Rod	((Ø10X200)mm	01



Take suitable dimension

Procedure:

- At first fit the job in chuck of the lathe with the help of chuck key.
- Then fit the cutting tool on the tool post.
- Then test whether the job is properly fixed or not on the lathe machine.
- After that start all operations to prepare a hammer.
- At last complete all the operation and produce a hammer

Conclusion:

Hence a hammer is prepared as per the given dimension.

Resources used (with major specifications)

Sl no.	Name of the apparatus	Specification	Quantity
01			
02			
03			

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04			
05			
06			
07			

Actual procedure followed:

Precautions followed:

Observations:

Results:

Interpretation of results:

Conclusions and recommendations if any:

Practical related questions:

1. What is the industrial way to manufacture a hammer.

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2. What are the different types of hammer.
3. What are the application of various types of hammer?
4. Which metal is used to prepare a hammer in the workshop.
5. What are the machining process done for preparation of hammer.

Space for answer

Assessment scheme:

Marking scheme	FOLLOW SAFETY RULES (5)	ABILITY TO FOLLOW INSTRUCTION & WORKING PROCEDURE(5)	SETUP AND EQUIPMENT CARE(5)	DIMENSIONAL ACCURACY AND SURFACE FINISH OF JOB (5)	Viva(5)	Full mark(25)
Marks obtained						

Faculty in charge

Head of the departme

Experiment no: 04

Aim of the experiment:

Cutting of slot, botch, mortise and tenon.

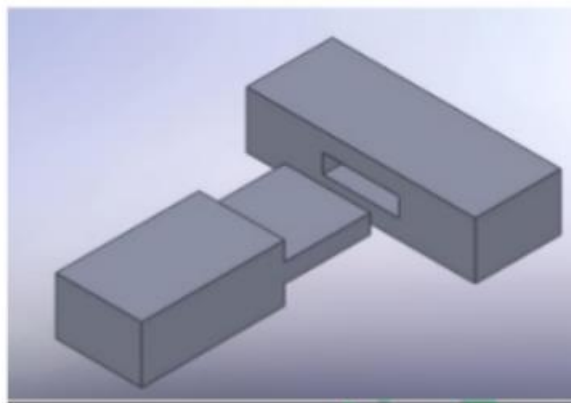
Tools and equipment required:

Sl. No	Name of the items	Specification	Quantity
01	Carpenter's Vice	600mm	01
02	Steel Rule	300mm	01
03	Jack Plane	250mm	01
04	Try Square	150mm	01
05	Marking Gauge	150mm	01
06	Firmer Chisel	25mm	01
07	Mortise Chisel	6mm	01
08	Cross Cut Saw	300mm	01
09	Tenon Saw	250mm	01
10	Scriber	150mm	01
11	Mallet	0.25Kg	01

Raw material required:

Sl no	Name of the items	Specification	Quantity
01	Wood Size	(50X50X250) mm	02

Figure:



Take suitable dimensions

Procedure:

- The given raw material is checked to ensure its correct size.
- The material is firmly clamped in the carpenter's vice and one of its faces are planned by the jack plane and checked for straightness.

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- The adjacent face is then planed and the faces are checked for squareness with the try square.
- Marking gauge is set and lines are drawn at 30 and 45mm to mark the thickness and width of the model respectively.
- The excess material is first chiselled out with the firmer chisel and then planned to correct size.
- The matching dimension of the part X and Y are then marked using the scale and marking gauge.
- Using the cross cut saw the portions to be removed in part Y (Tenon) is cut followed by chiselling.
- The material to be removed in Part X (Mortise) is carried out by using the mortise and firmer chisel.
- The part X and Y are separated by cross cutting with the tenon saw.
- The ends of both the part are chiselled to exact length.
- Finish chiselling is done where ever needed so that the parts can be fitted to obtain a neat tight joint.

CONCLUSION:

The mortise and tenon joint is thus made by following the above sequence of operations

Resources used (with major specifications)

Sl no.	Name of the apparatus	Specification	Quantity
01			
02			
03			
04			
05			
06			
07			

Actual procedure followed:

Precautions followed:

Results:

Interpretation of results:

Conclusions and recommendations if any:

Practical related questions:

1. What are the different types of saw?
2. What are the different types of chisel?
3. What is Carpentry joint ?
4. What are the marking tools used for carpentry operation?
5. What are the measuring tools used for joint?

Space for answer

Experiment: 05

AIM OF THE EXPERIMENT:

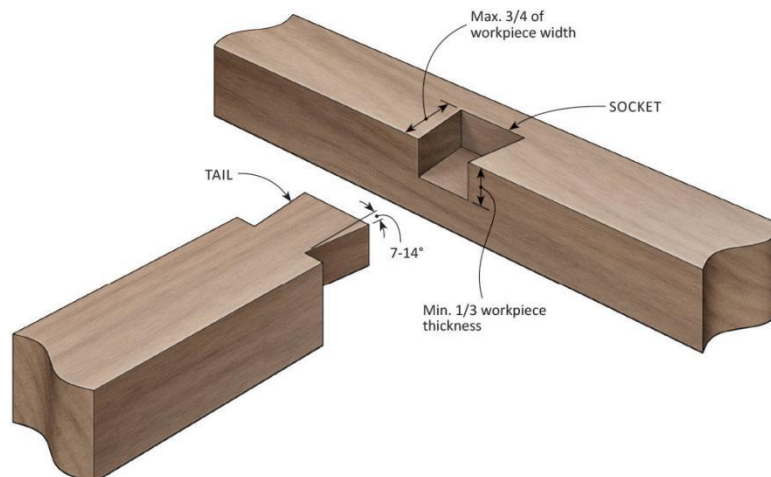
To prepare a single Dove Tail joints

Tools and equipment required:

Sl. No	Name of the items	Specification	Quantity
01	Carpenter's Vice	600mm	01
02	Steel Rule	300mm	01
03	Jack Plane	250mm	01
04	Try Square	150mm	01
05	Marking Gauge	150mm	01
06	Firmer Chisel	25mm	01
07	Mortise Chisel	6mm	01
08	Cross Cut Saw	300mm	01
09	Tenon Saw	250mm	01
10	Scriber	150mm	01
11	Mallet	0.25Kg	01

Raw material required:

Sl No	Name of the items	Specification	Quantity
01	Wood Size	(50X50X250)mm	02



Procedure:

- The give raw material is checked to ensure its correct size.
- The material is firmly clamped in the carpenter's vice and any two adjacent faces are planned by the jack plane and checked for straightness.

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- The adjacent face is then planed and the faces are checked for squareness with the try square.
- Marking gauge is set and lines are drawn at 30 and 45mm to mark the thickness and width of the model respectively.
- The excess material is first chiselled out with the firmer chisel and then planned to correct size.
- The matching dimension of the part X and Y are then marked using the scale and marking gauge.
- Using the cross cut saw the portions to be removed in part Y (Tenon) is cut followed by chiselling.
- The part X and Y are separated by cross cutting with the tenon saw.
- The ends of both the parts are chiselled to exact length.
- A fine finishing is given to the parts if required so that proper fitting is obtained.
- The parts are fitted to obtain a slightly tight joint.

CONCLUSION: -The single Dove Tail joint is thus made by following the above sequence of operations

Resources used (with major specifications)

Sl no.	Name of the apparatus	Specification	Quantity
01			
02			
03			
04			
05			
06			
07			

Actual procedure followed:

Precautions followed:

Observations:

Results:

Interpretation of results:

Conclusions and recommendations if any:

Practical related questions:

1. What are the procedure of cutting by saw?
2. What are the procedure of chiseling?
3. What are the different types of timber for carpentry job?
4. Methods of sharpening cutting tool used in carpentry?

Space for answer

Experiment no- 06

Aim of the experiment:-

To Prepare a Door ring with Hook.

Apparatus required:-

Sl. No	Name of the items	Specification	Quantity
01	Round Nose Tong	300mm	01
02	Hammer	2Kg and 1.25Kg	02
03	Anvil	50Kg	01
04	Swage Bock	80Kg	01
05	Forge or Hearth	-	01

Raw material required:-

Sl no	Name of the items	Specification	Quantity
01	M.S. Rod	Ø10X100mm	01
02	M.S. Rod	Ø6X100 mm	01

Figure:



(Take suitable dimension)

Procedure:-

- At first maintain the required size of the M.S. Rod.
- Now put the two M.S. Rods in the previously burning hearth.
- The M.S. Rod takes heat from the hearth and its temperature begins to increase.

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- When its temperature reaches 1000°C to 1200°C approx., it comes to red hot stage.
- Now remove the M.S. Rod from the hearth and hammering it on the anvil to the required shape.
- Then fitted the hook with the ring.

Conclusion:-

Finally a door ring with hook as shown in figure is prepared.

Resources used (with major specifications)

Sl no.	Name of the apparatus	Specification	Quantity
01			
02			
03			
04			
05			
06			
07			

Actual procedure followed:

Precautions followed:

Observations:

Results:

Interpretation of results:

Conclusions and recommendations if any:

Practical related questions:

1. Which types of coal can be used in smithy furnaces?
2. Which metal is suitable for preparation of ring and hook.
3. What are the striking tools used during preparation of hook and ring?
4. Use of anvil in smithy shop and during preparation of hook and ring.
5. What are the holding tools used during preparation of door ring and hook.

Space for answer

Experiment no- 07

Aim of the experiment:-

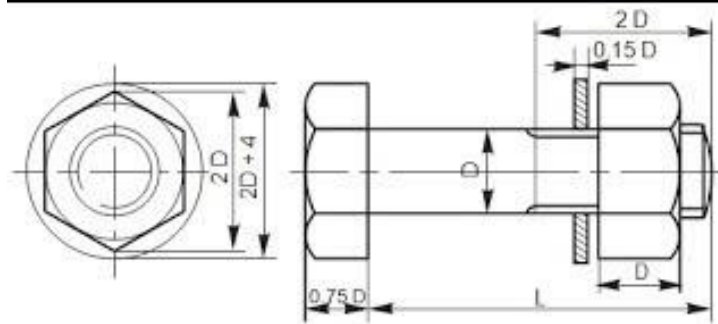
Preparation of hexagonal head bolt

Apparatus required:-

Sl no	Name of the items	Specification	Quantity
01	Round Nose Tong	300mm	01
02	Hammer	2Kg and 1.25Kg	02
03	Anvil	50Kg	01
04	Swage Bock	80Kg	01
05	Forge or Hearth	--	01
06	Char coal	--	As per requirement

Raw material required:-

Sl no	Name of the items	Specification	Quantity
01	M.S. Rod	(Ø16X150)mm	01



A hexagonal headed bolt with a nut and a washer in position

Procedure:-

- At first cut the M.S. Rod to the required size.
- Now the rod put on the burning hearth to make it red hot stage.
- The M.S. Rod takes heat from the hearth and its temperature begins to increase.
- When its temperature reaches 1000°C to 1200°C, it comes to red hot stage.
- Now remove the M.S. Rod from the hearth and hammering it on the swage block/anvil to

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the required shape.

- Repeat the above process till we get exact Octagonal shape.
- Then quenching the job in the water

Conclusion:-

Finally we got a hexagonal head bolt by following the above procedure.

Resources used (with major specifications)

Sl no.	Name of the apparatus	Specification	Quantity
01			
02			
03			
04			
05			
06			
07			

Actual procedure followed:

Precautions followed:

Observations:

Results:

Interpretation of results:

Conclusions and recommendations if any:

Practical related questions:

1. Which metal to be use for preparation of hexagonal head bolt.
2. Which types of hammer is used during preparation of hexagonal head bolt?
3. What is the use of swage block.
4. Describe the process of marking a hexagonal head bolt.
5. What is the nominal diameter of bolt?

Space for answer

Experiment no- 08

Aim of the experiment:-

To Prepare Octagonal Flat Chisel.

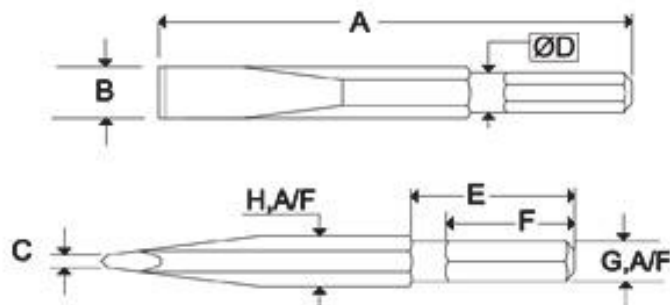
Apparatus required:-

Sl no	Name of the items	Specification	Quantity
01	Round Nose Tong	300mm	01
02	Hammer	2Kg and 1.25Kg	02
03	Anvil	50Kg	01
04	Swage Bock	80Kg	01
05	Forge or Hearth	--	01
06	Char coal	--	As per requirement

Raw material required:-

Sl no	Name of the items	Specification	Quantity
01	M.S. Rod	($\varnothing 16 \times 150$)mm	01

Figure:



(Take suitable dimension)

Procedure:

- At first cut the M.S. Rod to the required size.

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- Now the rod put on the burning hearth to make it red hot stage.
- The M.S. Rod takes heat from the hearth and its temperature begins to increase.
- When its temperature reaches 1000°C to 1200°C , it comes to red hot stage.
- Now remove the M.S. Rod from the hearth and hammering it on the swage block to the required shape i.e. octagonal shape.
- Repeat the above process till we get exact Octagonal shape.
- Then quenching the job in the water.

Conclusion:

Finally we got an Octagonal Flat Chisel by following the above procedure

Resources used (with major specifications)

Sl no.	Name of the apparatus	Specification	Quantity
01			
02			
03			
04			
05			
06			
07			

Actual procedure followed:

Precautions followed:

Results:

Interpretation of results:

Conclusions and recommendations if any:

Practical related questions:

1. Which furnace is used to prepare the job?
2. What are different types of tongs used?
3. What is the use of anvil?
4. What is hardening?

Space for answer

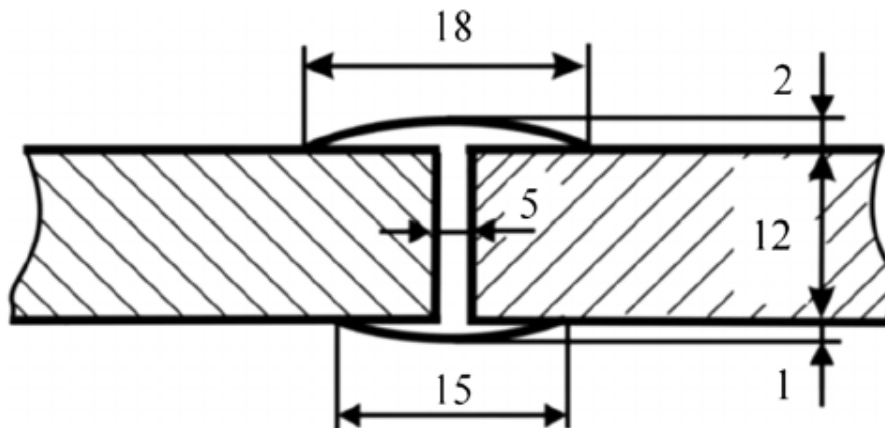
Experiment no- 09

Aim of the experiment:

To prepare a Butt Joint through Arc welding.

Apparatus required:

Sl no.	Name of the apparatus	Specification	Quantity
01	Rough File	300mm	01
02	Arc welding Machine	350 amperes	01
03	Electrode Holder	300 amp/800 amp	01
04	Ground Clamp	100 mm	01
05	Tongs	300 mm	01
06	Welding Hand Screen	(108 x 82) mm	01
07	Hammer	Chipping Type	01
08	Apron	Lather	01
09	Gloves	lather	01 pair



Raw material required:

Two number of M.S Flat with dimension (80x40x6)mm.

Procedure:

- The given M.S Flats are thoroughly cleaned .
- The two pieces of M.S Flat positioned on the welding table (as shown in figure) such that they are separated slightly for better weld joints and well penetration of the weld.

- Then electrode is fitted in the electrode holder and the welding current is to be set with proper value according to the requirement.
- Before welding operation some precaution has to be taken. These are wearing apron, using hand gloves and hand screen.
- The welding process is done with proper selection of welding parameters (accelerating voltage, welding current, welding speed) on the welding machine.
- Then welding is done by the help of electrode holder with filler metals, then arc is created by the contact with electrode and work piece.
- During the process of welding the electrode is kept at 15 to 25 degree angle from vertical and the direction of welding respectively.
- After welding operation is completed the scale formation on the welding zone is removed by the help of chipping hammer.

Conclusion:

The Butt Joint is thus made using above procedure.

Resources used (with major specifications)

Sl no.	Name of the apparatus	Specification	Quantity
01			
02			
03			
04			
05			
06			
07			

Actual procedure followed:

Precautions followed:

Results:

Interpretation of results:

Conclusions and recommendations if any:

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Practical related questions:

1. What do u mean by lap joint?
2. How many types of lap joints are there?
3. What do you mean by arc welding?
4. What are the types of welding process available?
5. What do u call the deposit of filler metal?

Space for answer

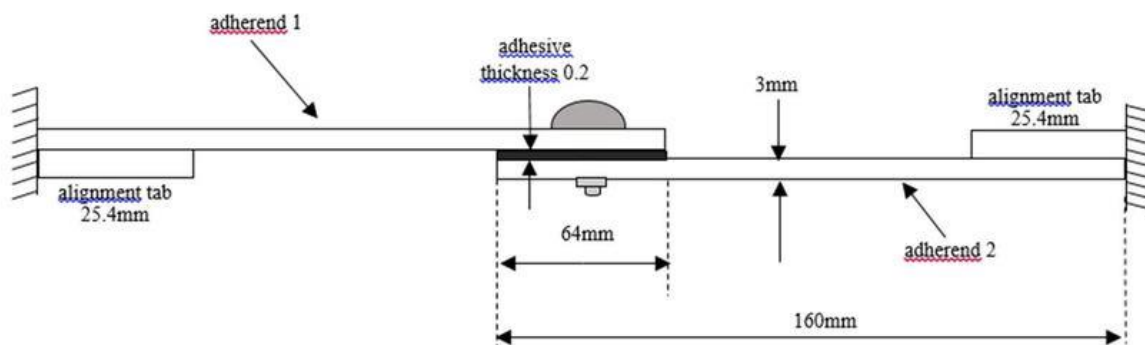
Experiment no- 10

Aim of the experiment:

To prepare a Lap Joint through Gas welding

Apparatus required:

Sl no.	Name of the apparatus	Specification	Quantity
01	Oxygen cylinder	7 m ³ /120-150 Kg/cm ²	01
02	Acetylene Cylinder	6 m ³ /15-16 Kg/cm ²	01
03	Hand Screen	(108 x 82) mm	01
04	Hammer(Chipping)	200 gm	01
05	Tongs	300 mm	02



Raw material required:

Two number of M.S Flat with dimension (75x40x6)mm.

Procedure:

- The given M.S Flats are thoroughly cleaned.
- Before welding operation some precaution has to be taken. These are wearing apron using hand gloves, hand screen and Goggles.
- Oxygen and acetylene are supplied through the different cylinder. Oxygen cylinder is painted in Black colour and acetylene cylinder is Marked in Maroon colour
- The workpieces are positioned (as shown in figure) on the welding table to form a lap joint with the required overlapping.
- Then welding flame is required to fuse the metal by combination of acetylene

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- and oxygen with proper value. Acetylene and oxygen are mixed together.
- The alignment of the lap joint is checked and the tack-welded pieces are reset if required.

Conclusion:

The Lap Joint is thus made using above procedure.

Resources used (with major specifications)

Sl no.	Name of the apparatus	Specification	Quantity
01			
02			
03			
04			
05			
06			
07			

Actual procedure followed:

Precautions followed:

Results:

Interpretation of results:

Conclusions and recommendations if any:

Practical related questions:

1. What is gas welding.
2. What is the chemical composition of gas used for oxy-acetylene gas welding?
3. What is filler rod?
4. Describe the process of gas welding.
5. What is the use of oxygen and acetylene in gas welding?
6. What are the types of flame in gas welding?

Space for answer

EXPERIMENT NO- 11

Aim of the experiment:

Joining two non-ferrous parts through TIG /MIG.

Apparatus required:

Sl no.	Name of the apparatus	Specification	Quantity
01	MIG welding Transformer	50-80 amp	01
02	CO ₂ cylinder	7 m ³	01
03	Hand screen	(180 x 80) mm	01
04	Hammer(Chipping)	Chipping type	01
05	Tongs	300 mm	02

Raw material required:

Two number of Aluminium Plates with dimension (75x40x6)mm.

Procedure:

- The given Aluminium Plates are thoroughly cleaned.
- Before welding operation some precautions has to be taken. These are Wearing apron, using hand gloves, hand screen and Goggles.
- The work pieces are positioned (as shown in figure) on the welding table to form a proper joining.
- The alignment of the weld joint is properly checked.
- The welding operations are performed by using D.C with reverse polarity (Electrode +ve and Work piece -ve).
- A control unit is required which objective is to supply the power, wire drive, movement of the Gun and regulates the gas supply.
- This welding process uses consumable electrode which is fitted through the electrode holder into the arc and the same speed of the electrode is maintained in the welding process.
- A small adjustable speed motor is used to remove wire from a spool and feed it into the arc.
- In some cases various shielding gases (CO₂, He, Ar) for welding various types of carbon sheet.
- In this case the metal transfer occurs by heating both the consumable filler electrode and the work piece so that proper joining of aluminium plate takes place.

Conclusion:

By using TIG or MIG, we can join two non-ferrous parts.

Resources used (with major specifications)

Sl no.	Name of the apparatus	Specification	Quantity
01			
02			
03			
04			
05			
06			
07			

Actual procedure followed:**Precautions followed:****Results:****Interpretation of results:****Conclusions and recommendations if any:**

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Practical related questions:

1. What are the welding processes to perform on non-ferrous materials?
2. Can a non ferrous metal weld by arc welding process?
3. Which welding process is preferable for weld a non ferrous metal?
4. Name some non ferrous metal and their alloys.
5. Why it's important to use same filler rod for same metal during welding process?

Space for answer

Assessment scheme:

Marking scheme	FOLLOW SAFETY RULES (5)	ABILITY TO FOLLOW INSTRUCTION & WORKING PROCEDURE(5)	SETUP AND EQUIPMENT CARE(5)	DIMENSIONAL ACCURACY AND SURFACE FINISH OF JOB (5)	Viva(5)	Full mark(25)
Marks obtained						

Faculty in charge

Head of the department