

WORKSHOP PRACTICE-II (MEP-302)

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EXPERIMENT NO- 01

AIM OF THE EXPERIEMENT:-

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:-

- 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.

CONCLUSION:-

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

EXPERIMENT NO 02

AIM OF THE EXPERIEMENT :-

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:-

- 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.

CONCLUSION:-

Finally a Try Square of required dimension has been prepared.

EXPERIMENT NO- 03

AIM OF THE EXPERIEMENT :-

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

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.

EXPERIEMNT NO: 04

AIM OF THE EXPERIEMNET:-

Male and Female fitting.

TOOLS AND EQUIPMENT REQUIRED:-

SL. NO	NAME OF THE ITEMS	SPECIFICATION	QUANTITY
01	Bench Vice	125mm	01
02	Hack Saw frame with blade	300mm	01
03	Bastard File	300mm	01
04	Square File	200mm	01
05	Scriber	150mm	01
06	Ball Pen Hammer	0.25Kg	01
07	Centre Point	125mm	01
08	Try Square	150mm	01
09	Odd Leg Calliper	150mm	01
10	Steel Rule	300mm	01
11	Smooth File	250mm	01
12	Vernier Calliper	200mm	01

RAW MATERIAL REQUIRED:-

SL NO	NAME OF THE ITEMS	SPECIFICATION	QUANTITY
01	M.S. Flat	(50X50X6)mm	01

PROCEDURE:-

- First check the raw material size as required.
- File two adjacent sides and make the right angle.
- Put marking media to mark the job and give punch mark on the marking line.
- Cut the extra material by using hack saw.
- File all sides , edges and surfaces properly.
- First finish the male part then female part and check the dimensions by verniner calliper.
- At last finish and fit the male and female part and complete the job.

CONCLUSION:-

The required male and female fitting is thus obtain by following the stages as described above.

EXPERIEMNT NO: 05

AIM OF THE EXPERIEMNET:-

Cutting of slot, notch, 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	01

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 planed by the jack plane and checked for straightness.
- 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 planed 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 near tight joint.

CONCLUSION: -The mortise and tenon joint is thus made by following the above sequence of operations.

EXPERIEMNT: 06

AIM OF THE EXPERIEMNET:-

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	01

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.
- 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 part 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.

EXPERIEMNT NO: 07

AIM OF THE EXPERIEMNET:-

Plain turning and step turning

TOOLS AND EQUIPMENT REQUIRED:-

SL. NO	NAME OF THE ITEMS	SPECIFICATION	QUANTITY
01	Chuck Key	-	01
02	Steel Rule	300mm	01
03	Vernier Calliper	300mm	01
04	Surface Gauge	150mm	01
05	Box Spanner	-	01
06	Single Point Cutting Tool	HSS 4"	01

RAW MATERIAL REQUIRED:-

SL NO	NAME OF THE ITEMS	SPECIFICATION	QUANTITY
01	M.S. Rod	Ø35X100mm	01

PROCEDURE:

- Fit the job in the chuck of the lathe with the help of chuck key.
- Fit the cutting tool on the tool post.
- Test the job whether it is properly fitted or not by surface gauge.
- Now start the machine and do plane turning by giving small feed to the cutting tool and by moving the hand wheel of the carriage.
- Then when the entire length of the work piece is turned , start step turning.
- Step turning is done on the required length of the job as per sketch. The step turning diameter is also given in the sketch.
- Step turning is done by giving more cross feed movement to the cutting tool as per diameter required.
- Repeat the above steps till the required diameter is achieved.
- Measure the accurate dia. by using a vernier calliper and finish the step turning.

CONCLUSION:

Finally we obtained a job with required shape and dimension by help of plane turning and step turning.

EXPERIEMNT NO: 08

AIM OF THE EXPERIEMNET:-

Taper turning and grooving operation.

TOOLS AND EQUIPMENT REQUIRED:-

SL. NO	NAME OF THE ITEMS	SPECIFICATION	QUANTITY
01	Chuck Key	-	01
02	Steel Rule	300mm	01
03	Vernier Calliper	300mm	01
04	Surface Gauge	150mm	01
05	Box Spanner	-	01
06	Single Point Cutting Tool	HSS 4"	01
07	D.Spanner	14-15	01

RAW MATERIAL REQUIRED:-

SL NO	NAME OF THE ITEMS	SPECIFICATION	QUANTITY
01	M.S. Rod	Ø35X100mm	01

RELATED FORMULA:

Taper formula $\theta = \tan^{-1}\left(\frac{D-d}{2l}\right)$

Where D = Larger diameter = 30mm

D = Smaller diameter = 15mm

L = Length of taper = 30mm

So, $\theta = \tan^{-1}\left(\frac{D-d}{2l}\right) \Rightarrow \theta = \tan^{-1}\left(\frac{30-15}{2 \times 30}\right) = 14^{\circ}2' \approx 15^{\circ}$

PROCEDURE:

- Properly fit the job in the chuck of the lathe machine.
- Perform plane turning operation on entire length of the job up to dia 35mm.
- Then leave 30mm from left and do step turning operation on 20mm length till the dia reach 30mm.
- Now remove cutting tool and fit the grooving tool in the tool post.
- Do grooving operation in 5mm length up to dia. 20mm as per sketch by the grooving tool.
- Then remove grooving tool and enter cutting tool.
- Then taper turning is done on next 30mm length as shown in sketch.
- Taper turning is done by setting the compound slide at an angle calculated above (that is $\theta = 15^{\circ}$) moving carriage along length of taper.

CONCLUSION:-

Finally we obtain the required shape and size of the job by taper turning and grooving operation.

EXPERIEMNT NO: 09

AIM OF THE EXPERIEMNET:-

Chamfering and external threading.

TOOLS AND EQUIPMENT REQUIRED:-

SL. NO	NAME OF THE ITEMS	SPECIFICATION	QUANTITY
01	Chuck Key	-	01
02	Steel Rule	300mm	01
03	Vernier Calliper	300mm	01
04	Surface Gauge	150mm	01
05	Box Spanner	-	01
06	Single Point Cutting Tool	HSS 4"	01
07	D.Spanner	14-15	01

RAW MATERIAL REQUIRED:-

SL NO	NAME OF THE ITEMS	SPECIFICATION	QUANTITY
01	M.S. Rod	Ø35X100mm	01

PROCEDURE:-

- Fit the job in the lathe machine chuck.
- Do plane turning and step turning as per sketch.
- Set the compound slide at 45^0 and do chamfering by the chamfer tool on the required dimension as per sketch.
- Then set the gear box for external threading and connect the carriage with the lead screw.
- Then start the external threading operation on the required length as shown in figure.

CONCLUSION:-

The chamfering and external threading operation is done on the job by following the above procedure.

EXPERIMENT NO- 10

AIM OF THE EXPERIEMENT:-

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

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.
- When its temperature reaches 1000⁰C to 1200⁰C 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.

EXPERIMENT NO- 11

AIM OF THE EXPERIEMENT:-

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

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 1000⁰C to 1200⁰C, it comes to red hot stage.
- Now remove the M.S. Rod from the hearth and hammering it on the swage block/ anvil to 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.

EXPERIMENT NO- 12

AIM OF THE EXPERIEMENT:-

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	(Ø16X150)mm	01

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 1000⁰C to 1200⁰C, 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