"ASSIGNMENT-6"

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"Machine Shop"

Introduction :- A machine shop is a building, room or Company where machining is done, which is a form of subtractive manufacturing.
Those who work in Machine shop are machinists.
The production can consists of cutting, shaping, drilling finishing and other processes. The machine tools typically include metal lathes, milling machines, drill press or grinding machines etc., many controlled with Computer Numerical Control (CNC).

Other processes, such as heat treating, electroplating and painting of the parts before and after machining, are often done in a seperate facility.
Talent and experience in a machine shop can both be scarce and valuable.

Lathe :- A Lathe is a machine that rotates a workpiece about an axis of rotation to perform various operations such as cutting, sanding, knurling, drilling, deformation, facing and turning with tools that are applied to the workpiece to create an object with symmetry about that axis.

Lathe is used in woodturning, metal working, metal spinning, thermal spraying and glass working.
It can be used for shape pottery, the best-known design being the Potter's wheel.

Main Parts of Lathe :-

① Bed :- It is main body of machine. All main components are bolted on it. It is usually made by cast iron due to its high Compressive strength. It is made by Casting process and bolted on floor space.

② Tool Post :- It is bolted on the carriage. It is used to hold at correct position. Tool holder mounted on it.

③ Chuck :- chuck is used to hold workspace. It is bolted on the spindle which rotates the chuck and work piece. It is four Jaw or three Jaw as per need.

④ Head stock :- Head stock is the main body parts which are placed at left side of bed. ~~The~~ It serves as holding device for the gear chain, spindle. It is made up of Cast Iron.

⑤ Tail stock :- Tail stock situated on bed. It is placed at Right hand side of the bed. The main function of Tail stock to support the job when required It is also used to perform drilling operations.

⑥ Lead screw :- Lead screw is situated at the bottom side of bed used to move the carriage auto-matically during thread Cutting.

⑦ Legs :- Legs are used to carry all the load of machine.

⑧ Carriage :- It is used to hold and move the tool post on the bed. Carriage is made by Cast Iron.

⑨ Apron :- It is situated on Carriage. It consist all Controlling and moving mechanism of Carriage.

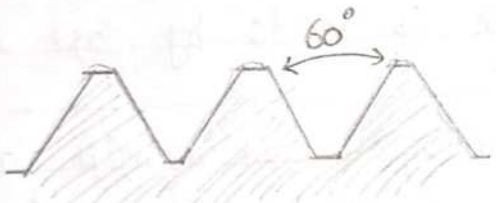
⑩ Chip Pan :- Chip Pan is placed lower side of bed. The main function of it to carries all chips removed by work piece.

⑪ Guide ways :- It take care of movement of tail stock and Carriage on bed.

⑫ Speed Controller :- It is situated on head stock which controls the speed of spindle.

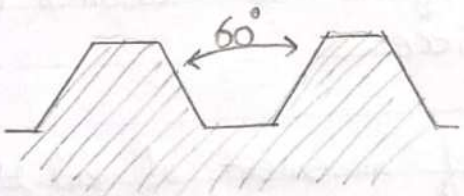
⑬ Spindle :- It is main part of lathe which holds and rotates the chuck.

"Types of Thread"

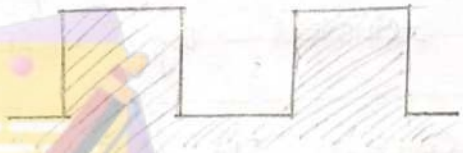


Metric

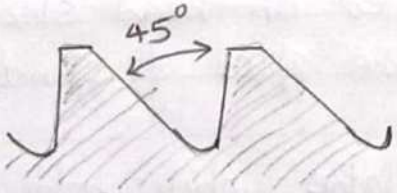
American National (Unified)



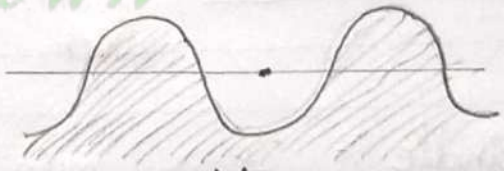
60° stub



Square



Buttress



Knuckle

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Tools Required :-

① Measuring Tools :- ⓐ Engineer's scale
ⓑ outside Caliper
ⓒ Inside Caliper

② Cutting Tools :- ⓐ facing and turning tool
ⓑ Threading tool
ⓒ Knurling tool
ⓓ Centre drill
ⓔ Parting off-tool

③ Supporting Tools :- Dead centre (Morse tapered MT5)

④ Additional Tools :- ⓐ Tool post key, ⓑ chuck key,
ⓒ Drill chuck key, ⓓ D-spanner.

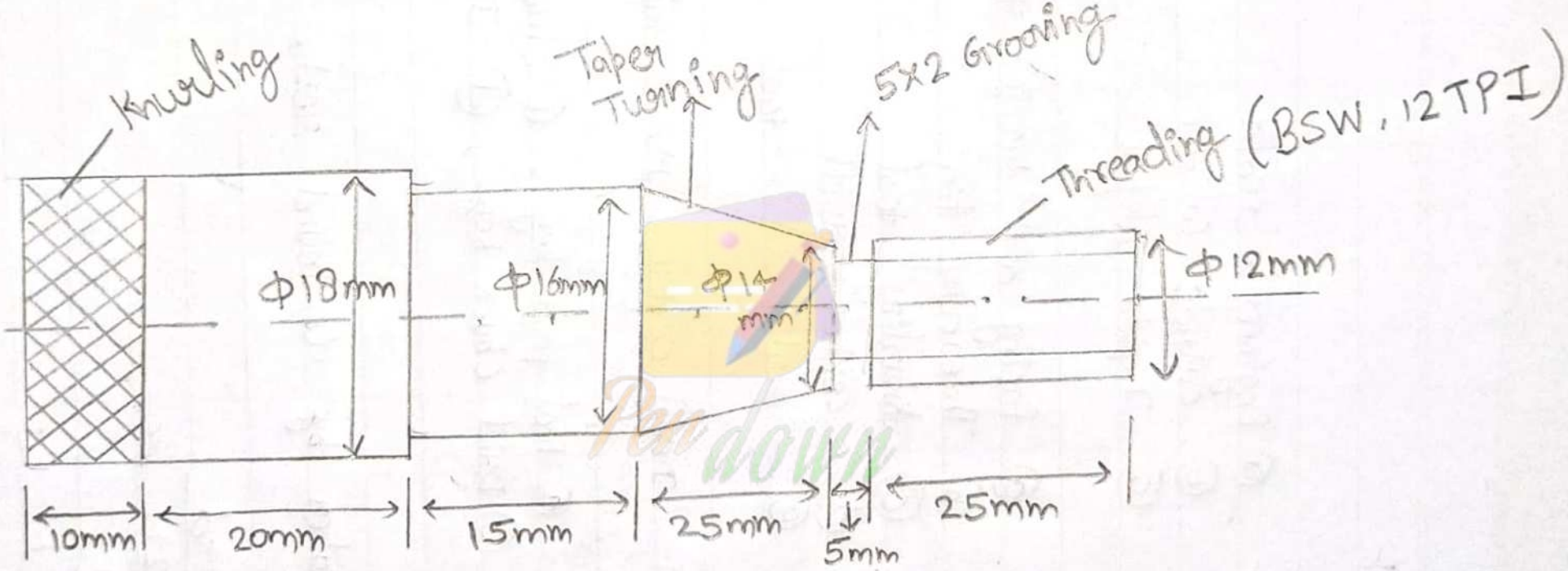
Taper formula :-

Taper by Compound rest,

$$\tan\theta = \frac{D-d}{2L}$$

or $$\boxed{\theta = \frac{(D-d)}{2L}}$$

where, D = large diameter
d = small diameter
L = Length



Model

Objective :- ✡ To make a job as per given drawing.
✡ study of Lathe Machine.

Raw Material required :- $(105 \times \phi 20)mm^2$ mild steel Rod

Tolerance :- $\pm 0.5mm$

List of operations :-
1. Measuring and marking
2. Knurling
3. Taper Turning
4. Grooving
5. Threading

Procedure :-
1. Take a $(105 \times \phi 20)mm^2$ mild steel Rod and do markings as per need.
2. Fix it on Lathe and do Knurling with Knurling tool.
3. The work piece is now held in a chuck. The angle required for Taper turning is achieved by rotating the guide bar.
4. A groove of 5mm is cut internally after the Taper turning on Lathe machine.
5. Now threading is done on the other end for about 25mm (as marked) by taking successive cuts with threading toolbit the same shape as the thread form required.

⑥ Finish the workpiece by removing from Lathe and check its dimensions that was needed.

Result:- The desired shape as per drawing is obtained.

Precautions:- ① Do not place hand on work turning in lathe.

② Do not make adjustments while the machine is operating.

③ Do not wear rings, watches or loose clothings.