Workshop Practice : Machining
Job 2 : To make a Pin by using Center Lathe
Material : mm Mild Steel rod.

(A) Name of operations :

1. Straight Turning
2. Step Turning
3. Grooving
4. Taper Turning
5. Thread Cutting
6. Facing Operations
7. Champering
8. Parting
9. knurling
10. Drilling

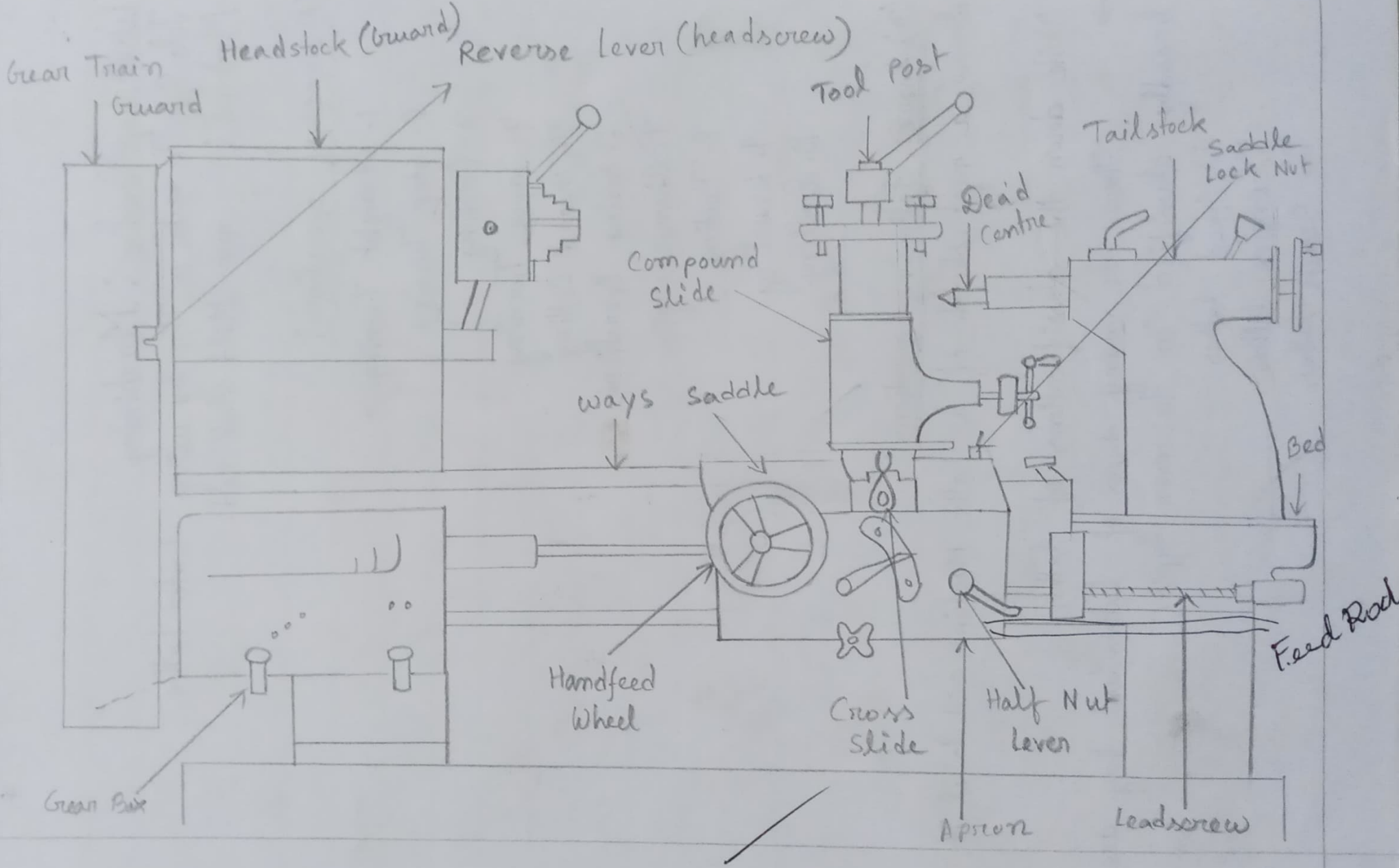
(B) Answer following questions :

1) Draw a neat sketch of a Lathe Machine and label it.

2) Write down the classifications of lathe.

→ There are many types of lathes but they are broadly classified in to seven types.

i) Speed lathes
ii) Engine lathes
iii) Bench lathes


Gear Train Guard
Headstock (Guard)
Reverse Lever (headscrew)
Tool Post
Tailstock
Saddle Lock Nut
Dead centre
Compound Slide
ways
Saddle
Bed
Handfeed Wheel
Cross Slide
Half Nut lever
Feed Rod
Gear Box
Apron
Leadscrew

iv) Tool room lathes.
v) Capstan and turret lathes.
vi) Special purpose lathes.
vii) Automatic lathes.

3) How lathe is specified ?

→ A lathe machine is specified by the following

- The height of the centers measured from the lathe bed.
- Swing diameter over bed. This is the largest diameter of the workpiece which will revolve without touching the bed. It is equal twice the height of centers from the bed.
- Swing diameter over carriage. It is the largest diameter that can revolve over the cross-slide. This is always less than the swing diameter over the bed.
- Maximum bar diameter. This is the maximum diameter that will pass through the headstock spindle.
- Length of the bed.

4) Write down the different jobs holding devices.

→ The following are the different jobs holding devices :-

(i) Chuck :-

Chucks are efficient and true devices for holding the job on the lathe during the operations. The most

common types of chucks are:

(a) three jaw chuck
(b) four jaw chuck
(c) Magnetic chuck
(d) Combination chuck
(e) Collect chuck

(ii) Face Plate:

It is usually a circular cast iron disc having threaded hole at its centre so that it can be screw to the threaded nose of the spindle. It consists of number of holes and slots by means of which the work can be secured.

(iii) Driving Plate:

It is a cast circular disk having a projected boss at its rear. The boss carriers internal threade so that it can be screwed on spindle nose. It also carriers a hole to accommodate a pain which engages with the tail of a lathe dog or carriers.

(iv) Angle Plate:

It is employed for holding odd shape work in conjunction with a faceplate. When the shape of the work is such that it is not possible to mount it directly of the face plate it can be mounted on angle plate. Lathe carriers or lathe Dogs.

These are used in conjunction with the driving plate. The work to be inserted in the 'v' shaped plate of the carrier and then firmly secured in position by meane of a screw, Lathe dogs have two types of tails:

(a) Straight Tail
(b) Bend Tail

5) Define the following terms:

→ (i) Feed :-

Feed is the generally travel per unit revolution of work piece in an axis perpendicular to direction of depth of cut.

There are three types of feed:

1) Longitudinal Feed.
2) Cross Feed.
3) Angular Feed.

(ii) Speed:

The speed is the rational frequency of the spindle of the machine, measured in revolutions per minute (RPM).

(iii) Depth of Cut:

Depth of cut is the thickness that is removed

as a workpiece is being machined. Depth of cut usually measured in thousandths of an inch or in millimeters. General machine practice is to use a depth of cut to five times the rate of feed, such as rough cutting stainless steel using a feed of 0.020 inch per revolution and a depth of cut of 0.100 inch, which would reduce the diameter by 0.200 inch.

(iv) Machining Time :-

Machining Time is the time when a machine is actually processing something. Generally, machining time is the term used when there is a reduction in material or removing some undesirable parts of a material.

6) Write down the different types of cutting tool material with composition.

→ The different types of cutting tool material are as follows :-

(i) Carbide tool - It is at the fourth place in terms of hardness. Its compositions are C = 0.8 - 1.3%, Si = 0.1 - 0.4% and Mn = 0.1 - 0.4%.

(ii) High Speed Steel Tool :-

It is at the fifth place in terms of hardness. Its compositions are 18% tungsten, 4% Chromium, 1% vanadium 0.7% carbon and the rest iron.

(iii) Ceramic Tool :-

It is at the third place in terms of hardness. Its compositions are mainly alumina (Al_2O_3) and Silicon nitride (SiN).

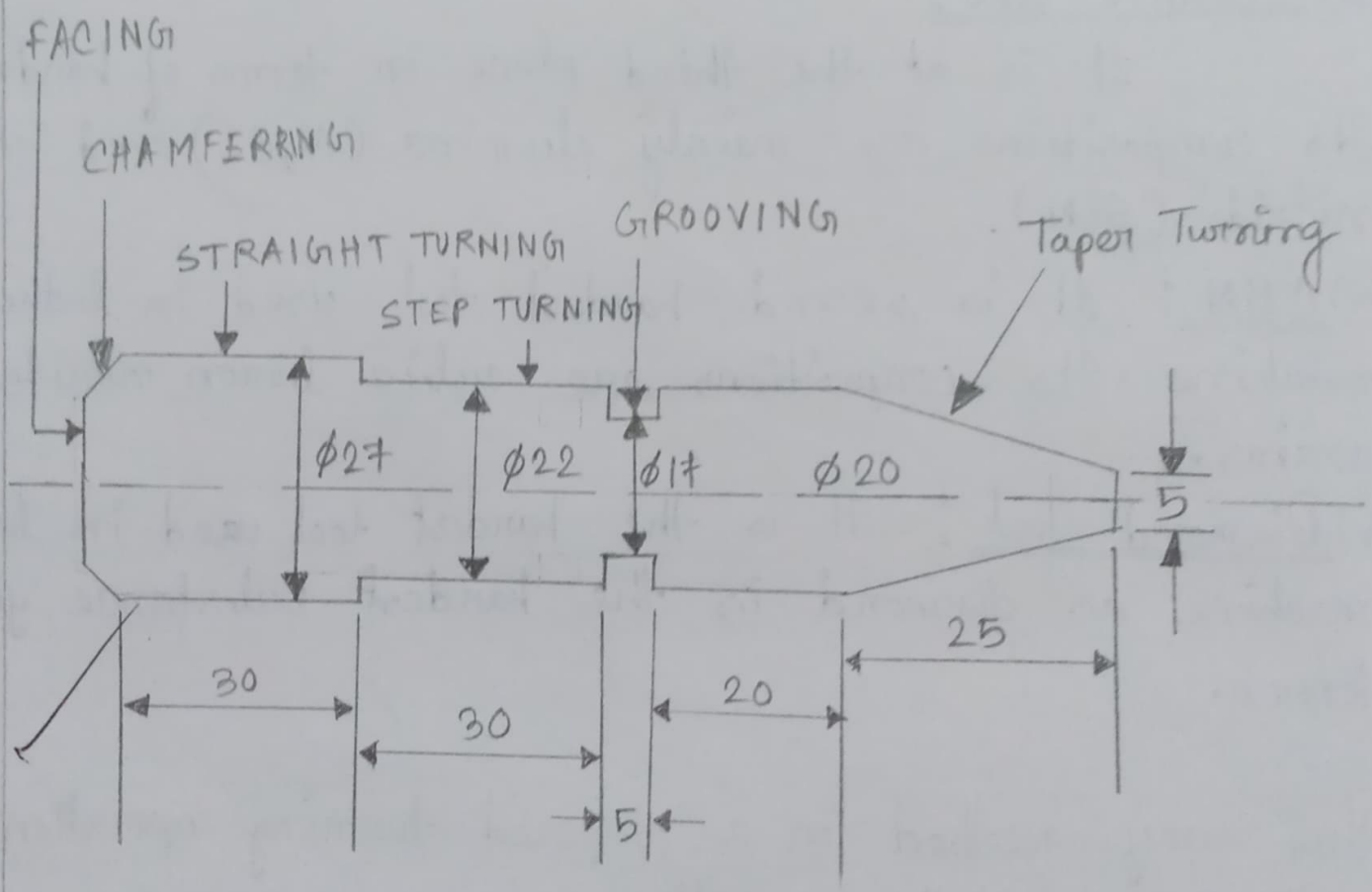
(iv) CBN :- It is second hardest tool used in lathe machine. Its compositions are cubic boron nitride grains.

(v) Diamond Tool :- It is the hardest tool used in lathe machine as diamond is the hardest substance yet known.

⇒ How many method in a tapered turning operation performed by lathe operations.

→ There are five methods used in tapered turning operations.

(i) Swirling the compound.
(ii) Offsetting the tail stock.
(iii) Use form tool method.
(iv) Use tapered turning attachment.
(v) Longitudinal and cross feed both at a time (combined feed).



* All DIMENSIONS ARE IN mm

8) What is the function of a Lead Screw & Feed rod?

→ The lead screw of a lathe machine is used to advance the carriage of the lathe in time with the rotation of the spindle. It is used to make threads.

Feed rod is a power transmission mechanism used for percise linear movement of the carriage along the longitudinal axis of the lathe.

9) Write some important operations performed in Lathe.

→ Some important operations performed in Lathe machine are as follows :-

(i) Straight turning.
(ii) Step turning.
(iii) Grooving.
(iv) Taper turning.
(v) Facing operations.
(vi) Champering.

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