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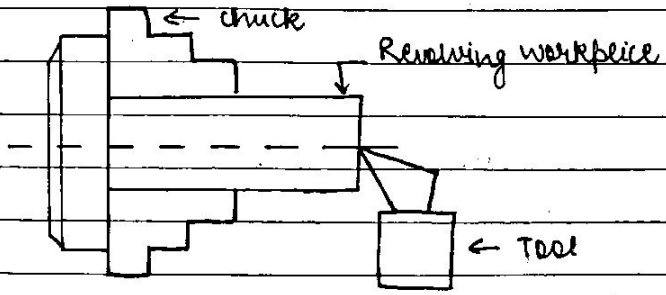
Assignment No. 4
Machine shop

CO3 - understand the use of lathe machine for shaping objects by removal of metal.

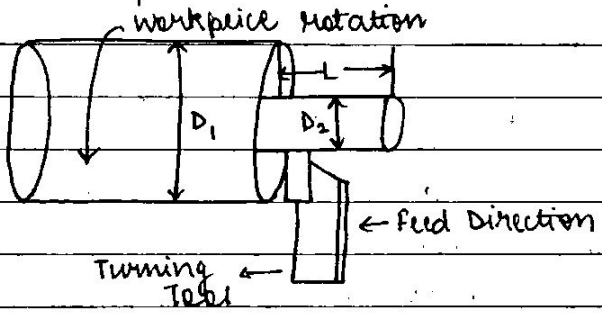
Q1) List with neat sketches the various operations that can be performed on centre lathe machine.

A) i) Facing -



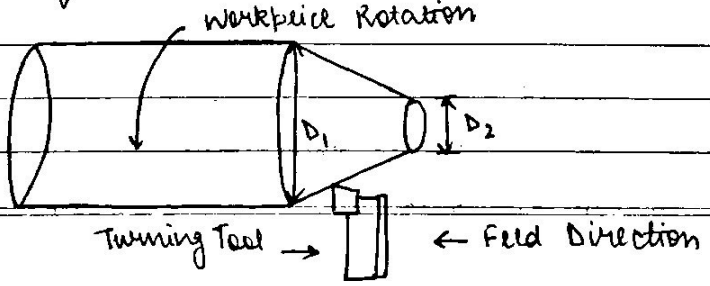
Facing is a common machine process that involves the use of a lathe or milling machine to remove material from the end or shoulder of a workpiece.

ii) Turning -



Turning is the removal of metal from the outer diameter of a rotating cylindrical workpiece. Turning is used to reduce the diameter of the workpiece, usually to a specified dimension, and to produce a smooth finish on the metal.

iii) Taper turning -



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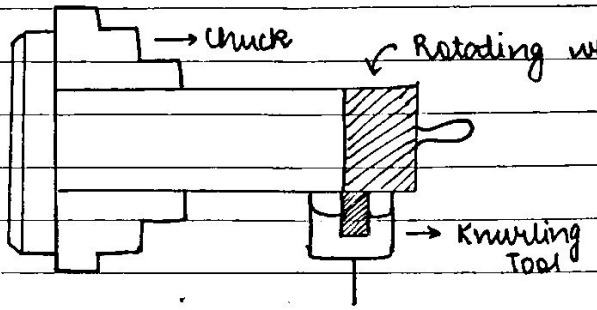
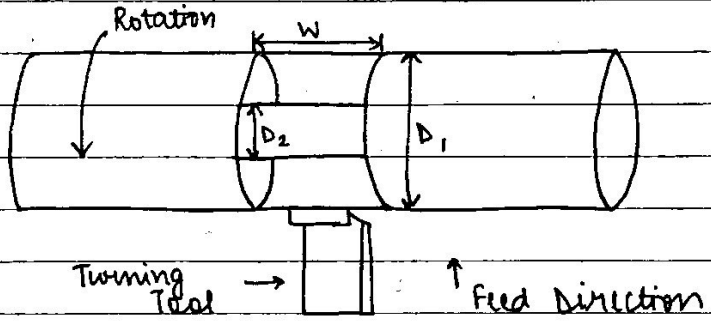
When the diameter of a peice changes uniformly from one end to the other, the peice is said to be tapered. Taper turning as a machine operation is the gradual reduction in diameter from one part of the cylinderical workpeice to other.

(iv) Knurling –



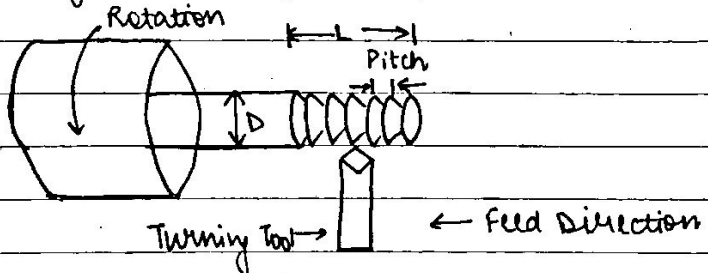
Knurling is a manufacturing process typically conducted on a lathe, whereby patterns of straight, angled or crossed lines is rolled on the material.

(v) Grooving –



Grooving is a turning operation that creates a narrow cut, a 'groove' in the workpeice. The size of the cut depends on the width of the cutting tool. Multiple tool passes are necessary for wider.

(vi) Threading –



Threading is a turning operation in which a tool moves along the side of the workpeice, cutting threads in the outer surface. A thread is a uniform helical groove of specified length and pitch.

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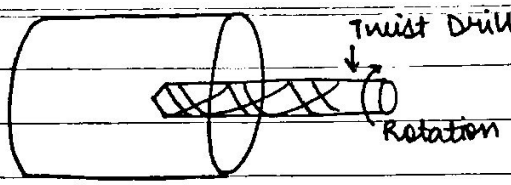
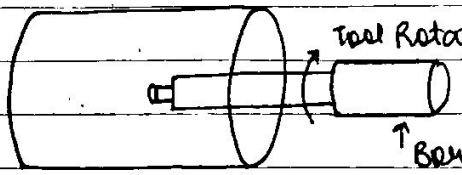
(vii) Drilling –



Drilling operation removes the material from the inside of a workpeice. The result of drilling is a hole with a diameter equal to the size of the utilized drill bit. Drill bits are usually positioned either on a tailstock or a lathe tool holder.

(viii) Boring –



In Boring operation, a tool enters the workpeice axially and removes material along the internal surface to either create different shapes or to enlarge an existing hole.

Q2) ~~(ix)~~ Explain in brief what is power saw.

A) • A power saw is a portable machine which comprises sturdy blades, chains, wire, set of teeth, etc. It is basically used for the work peice in large cuts. It can cut wood, plastic, metals, concrete and other materials like tiles and bricks. It can make curvilinear and straight cuts. There are both versatile and specialized power saws

• The varities of blades that come with the power saw are:

→ Rotating blades
→ Reciprocating blades
→ Circulating blades.

• The different types of power saws are:

→ Circular saw
→ Jig saw
→ Reciprocating saw
→ Table saw
→ Mitre saw.

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Q3) Write in brief difference between milling machine and shaper.

A)

	Shaper Machine	Milling Machine
1.	Lighter, cheaper and smaller.	Heavier, larger and costlier.
2.	Low accuracy	High accuracy of upto 0.02 mm.
3.	Power consumption is low.	Power consumption is high.
4.	Intended for small jobs	Intended for large jobs
5.	Requires less floor space.	Requires large floor space.
6.	Work settings require less skills and time.	Work settings require more skills and time.
7.	The metal is removed at a slow rate.	The metal is removed at a faster rate as the cutter has many cutting edges and rotates at higher speed.
8.	Only one cutter can be mounted.	More than one cutter can be mounted at a time.

Q4) Explain in brief the difference between single point cutting and multi point cutting tool.

	Single point cutting tool	Multi point cutting tool
1.	It only contains one main cutting edge in the cutter body	It contains more than one (even hundreds) cutting edges in cutter body.
2.	Only one main cutting edge remains continuously in contact with workpiece.	More than one cutting edges simultaneously engage in material.
3.	Chip load per tooth is usually high.	Effective load per chip reduces
4.	Design and fabrication of single point cutting tools are easier.	Design and fabrication of multi point cutting tools are difficult.
5.	Low feed rate and productivity.	Higher feed rate and MRR productivity.

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Q5) List down the various measuring instruments used in a machine shop.

A) The various metrology tools used in a machine shop are:

→ Surface Plate:
It is a flat surface used as a refrence point for vertical measurements.

→ Go / No-Go Gage:
It measures parts to ensure that they are within their specified tolerances.

→ Calipers:
Calipers measure by allowing two opposing tips to rest at the beginning and end of a distance being measured.

→ Micrometer:
It uses a calibrated screw, connected to a scale that moves as the screw is turned clockwise or counter clockwise.

→ Air Gage:
It uses pressurized air to measure the dimensions of an object.

→ Coordinate measuring machine (CMM)

→ Laser Scanning Arms