1. How a lathe machine is specified? Describe principal components of a centre lathe.

(Ans): Lathe machine is specified by:

(a) largest work diameter that can be swing over lathe bed.
(b) length of the bed.
(c) shape of bed ways and horse power of driving motor.
(d) Distance between head stock and tail stock centre.
(e) cast iron body.

Principle components of a central lathe are:.

HEAD STOCK: Mounted in a fixed position on the inner ways, usually at the left end using a chuck, it rotates the work.

TAIL STOCK: Fits on the inner ways of the bed and can slide over the position of headstock to fit the length of the workpiece.

CROSS SLIDE: Mounted on the transverse slide of the carriage and uses a hand wheel to feed tools into the work piece.

COMPOUND RESET: Mounted to the cross slide, it pivots around the tool post.

TOOL POST: To mount the tool holders to which cutting bits are clamped.

LEAD SCREW: For cutting threads.

FEED ROD : Has a key-way with two reversing gears, either of which can be meshed to forward or reverse the carriage using a clutch.

(2) Describe the following operations
(a) Turning (b) Facing (c) Grooving (d) Chamfering.

(Ans)

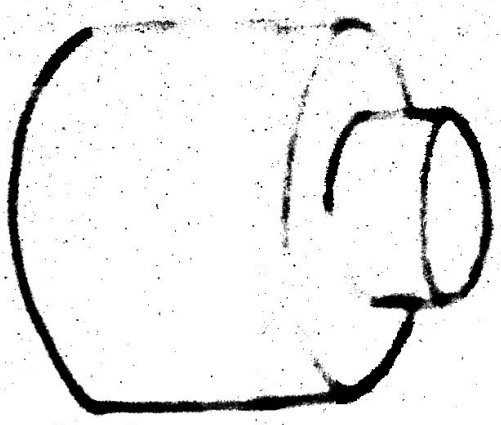
(a) TURNING : Cylindrical shapes, both external and internal are produced by turning operations. Turning is a process in which material is removed by a transverse cutting tool from the surface of a rotating piece.

(b) FACING : It is a machining operation performed to make the end surface of a work piece, flat and perpendicular to the axis of rotation. A facing tool is fed perpendicular to the axis of lathe.

(c) GROOVING : It is done on work piece shoulders to ensure the correct fit for mating parts. Grooving the workpiece prior to cylindrical grinding operations allows the grinding wheel to completely grind the workpiece without touching the shoulder.

(d) CHAMFERING : It is the operation of leveling the extreme end of a work piece. Chamfer is provided for better look, to enable nut to pass freely on threaded work piece from being damaged.

TURNING :



(3) Explain cutting speed, feed and depth of cut in relation to turning operation in lathe.

(Ans) CUTTING SPEED: is defined as the speed at which the material is removed and is specified in meters per minute. It depends upon workpiece material, feed, depth of cut, type of operation and so many other conditions.

It is calculated by:

spindle speed (RPM) = cutting speed $\times 1000 / \pi D$

D → diameter of work piece in mm.

FEED: It is the distance traversed by the tool along the bed, during one revolutions of the work. Its value depends upon the depth of cut and surface finish of the work desired.

DEPTH OF CUT: It is the movement of the cutting tool from the surface of the work piece and perpendicular to lathe axis. Its value depends upon the nature of operation like rough turning or finish turning.