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# Assignment-3:-

Q-1:- Explain working principle of shaper machine.

Sol$^n$→ A shaper machine is a special kind of manufacturing machine that uses liner reciprocating motion of single point cutting tool to generate a linear tool path.
In the shaper machine a single point cutting tool is rigidly mounted on the tool holder, which is mounted on the ram. The workpiece is held rigidly in a vice [or clamped directly on the table]. The ram reciprocated and thus cutting tool held in tool holder moves backward and forward on the work piece.
In a standard shaper, cutting takes place during the forward stroke of the ram and the backward stroke remains idle.

Q-2:- Explain various parts of shaper machine with neat sketch.

Sol$^n$→ Various parts of shaper machine are-

(i) Base→ It is the main body of the machine. It consists all element of machine. It works as pillar for other parts. Base is made by cast iron which can take all compressive loads.

(ii) Ram→ It is the main part of the machine. It holds the tool and provides the reciprocating motion to it. It is made by cast iron and move over ways on column. It is attached by rocker arm which provide it motion in crank driven machine and if the machine is hydraulic driven it is attached by ~~hydraulic~~ hydraulic housing.

(iii) Tool head→ It is situated at the front of the ram. Its main function is to hold the cutting tool. The

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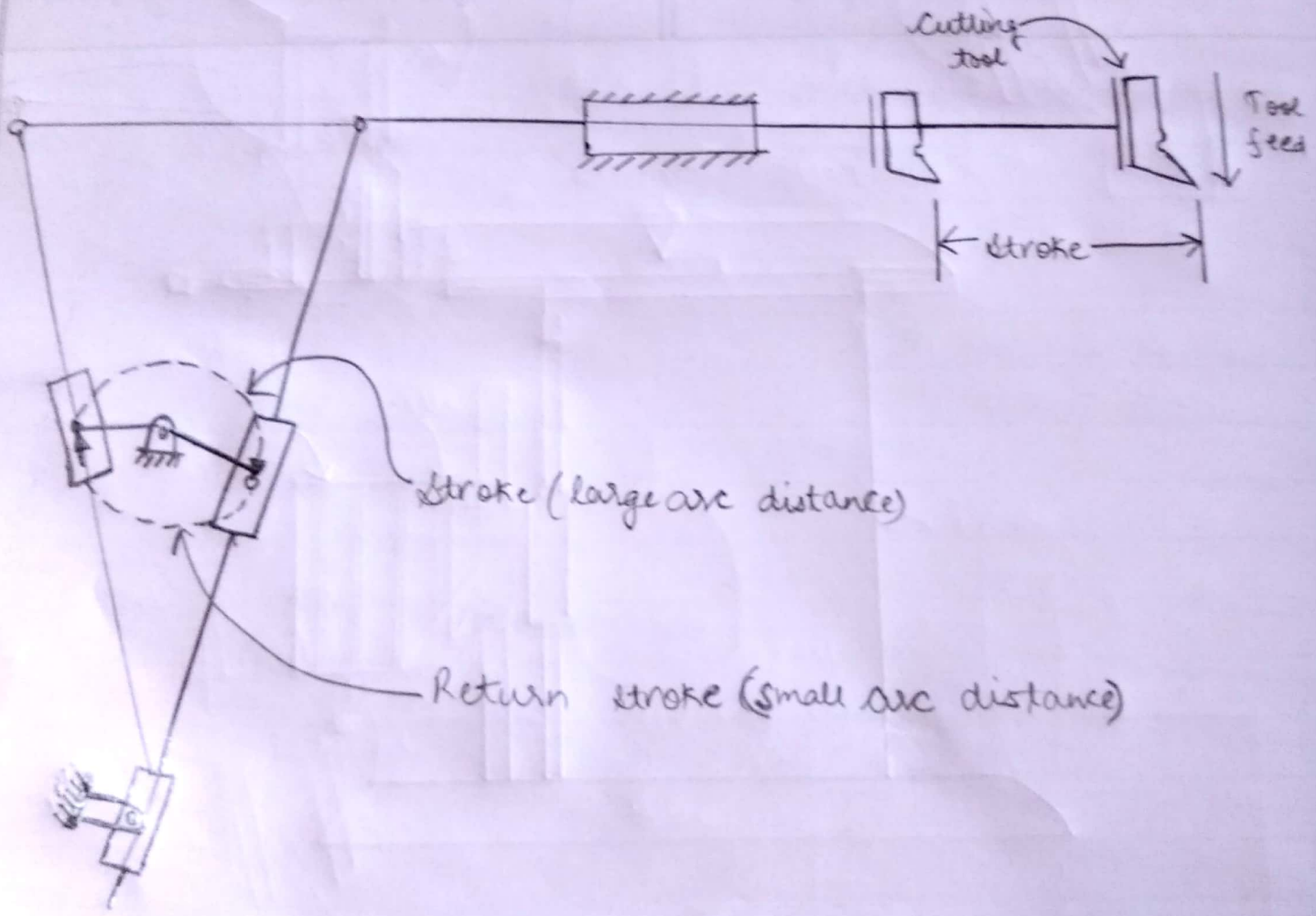


## Working Principle of shaper machine

tool can be adjusted on it by some of clamps.

(iv) Table:- It is the metal body attached over the frame. Its main function is to hold the work piece and vice over it. It has two T slots which used to clamp vice and work piece over it.

(v) Clapper box:- It carries the tool holder. The main function of clapper box is to provide clearance for tool in return stock. It prevents the cutting edge dragging the work piece while return stock and prevent tool wear.

(vi) Column:- column is attached to the base. It provides the housing for the crank slider mechanism. The slide ways are attached upper section of column which provide path for ram motion.

(vii) cross ways:- It consist vertical and horizontal table sideways which allow the motion of the table. It is attach with some cross movement mechanism.

(viii) Stroke adjuster:- It is attached below the table. It is used to control the stroke length which further controls the ram movement.

(ix) Table supports:- These are attached front side of the table. And used to support the weight of table during work.

Qs:- Why clapper box is used in shaper machine.

Sol$^n$ → It carries the tool holder. The main function of clapper box is to provide clearance for tool in return

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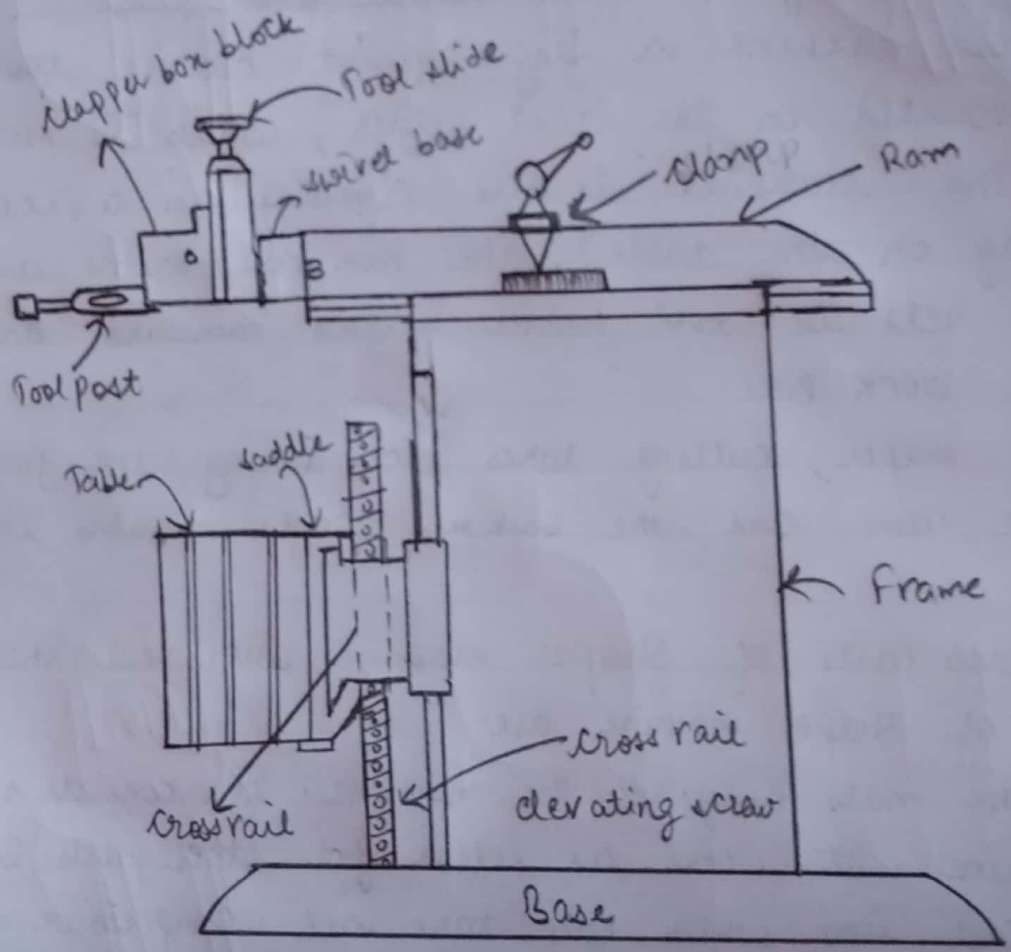


shaper machine

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stock. It prevents the cutting edge dragging the work piece while return stock and prevent tool wear

Q-4:- Explain various operations that can be performed on a shaper machine with diagram?

Sol$^{n}$→ Various operations performed on a shaper machine are-

(i) Machining horizontal surfaces:- It is the most common shaper machine operation. In this, work is fed in a horizontal direction under the reciprocating tool and the surface produced is horizontal and flat.

(ii) Machining vertical surfaces:- A vertical cut is made while machining the end of a workpiece, squaring up a block or cutting a shoulder. A side cutting tool is set on the tool post and position and length of stroke are adjusted.

(iii) Machining angular surface:- In this operation, an angular cut is done at any angle to the horizontal or to the vertical plane. The work is set on the table and vertical slide of the tool head is swivelled to the required angle either towards the left or towards right from vertical position.

(iv) Machining irregular surface:- For machining irregular surface, a round nose tool is used. For a shallow cut the apron may be set vertical but if the curve is quite sharp, the apron is swivelled towards the right or left away from the surface to be cut.

(v) cutting slots and keyways:- With suitable tools, a shaper

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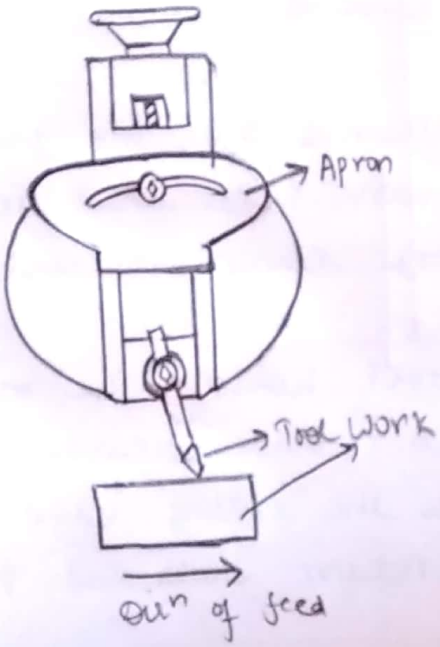
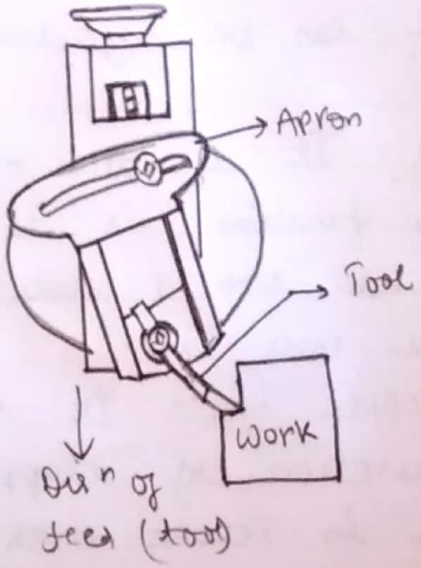
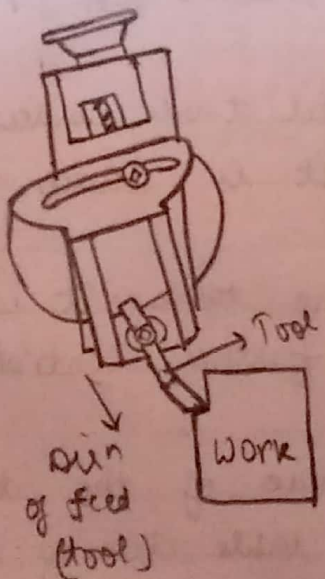


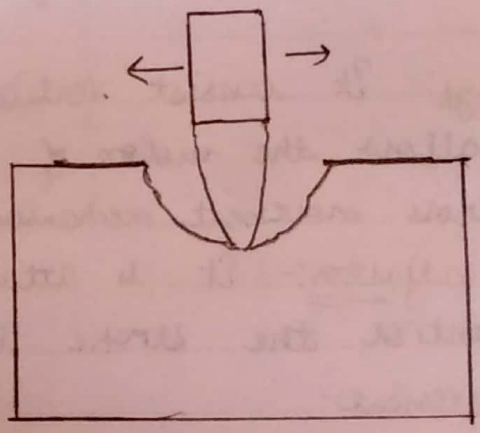

# Machining of horizontal surface



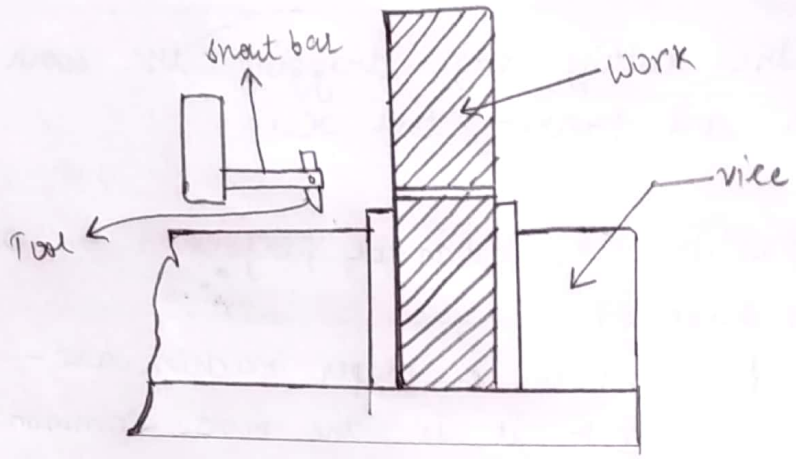

# machining of vertical surface.



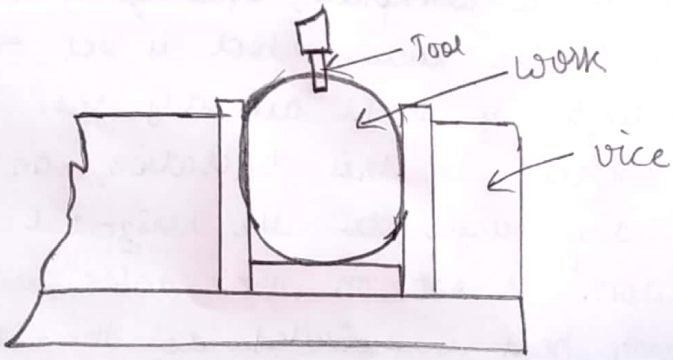

# machining of angular surface



# machining irregular surface




#machining of internal keyway




# machining of External Keyway

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can conviently machine slots or grooves on work or cut external keyways on shafts and internal keyways on pulleys or gears.

(11) Machining splines or cutting gears:- This type of operation can be done by using an index centre, illustrated in a gear or equally spaced splined may be cut. This work is placed between two centres, and a spline is cut similar to the cutting of a keyway.