# Assignment - 4

Q1 In miling machine, the metal is cut by means of a rotating cutter having multiple cutting edges. For cutting operation, the work piece is fed against the rotat-ory cutter. As the work piece moves against the cutting edges of miling cutter, the metal is removed in the form of chips of trochoid shape. Machined surface is formed in one or more passes of the work. The worm to be machine is held in a vice, a rotatory table, a three jaw chuck, an index head b/w centres in a special fixture or bolted to machine table. The rotatory speed of the cutting tool & feed rate of the work piece depends upon the type of material being machined.

Q2 (a) Column & Base - It is the main castling that supports all other parts of miling machine.
→ Column contain an oil reservoir & a pump which lubricate spindle
→ It rest on the base which contains coolant reservoir & a pump which is used during machine operation that requires coolant.

(b) Knee - Castling that support saddle & table. All general mechanism is enclosed within knee. It is fastened to column by dovetail ways. It slides up & down on the vertical ways of column face. An elevating screw mounting on base is used to adjust height of knee

(c) Saddle - Placed on the top of knee & slides on guide ways set exactly at 90° to the column face. Top of saddle provides guide ways for the table.

(d) Table - Rest on ways on saddle & travels longitudinally. A lead screw under the table engages a nut on the saddle to move the table horizontally by hand or power. In universal machines, table may also be swiveled horizontally.

(e) Overhanging arm - Used to fastened arbor support. It may consist of one or two cylindrical bars that slide through the holes in the column.

Q8

| Vertical | Horizontal. |
|---|---|
| (a) Spindle axis is aligned vertically | Spindle axis is placed horizontally |
| (b) Cheaper in price | (b) Little bit costly |
| (c) Poor surface finish | (c) Best surface finish |
| (d) Reduce tool life | (d) Help in increasing tool life. |
| (e) We do not get proper removal of chips | (e) Chips are removed & thrown away |
| (f) Working capacity low | (f) More working capacity |

Qy (a) Slide Miling - It produces flat & vertical surface at the sides of the work piece. Depth of cut is adjusted by vertical feed screw.

(b) Angular Miling - Produce angular surface on work piece. The produced surface makes an angle with axis of the spindle which is not right angle. Eg Production of V-shape groove.

(c) Form Miling - Produce irregular contours on the work surface. These irregular contours may be conver, concave or any other shape. Speed is very low in this operation.

(d) End Miling - Produce flat vertical surface, horizontal surface & others making an angle from table surface using miling cutter named as end mill. It is carried out on vertical milling machine.

(e) Saw Miling - Produce narrow slots & grooves into work piece using saw miling cutter. Also used to cut the work piece into two equal / unequal piece which cut is also known as 'Parting off'.

(f) Helical Miling - Produce helical fluter / grooves on the periphery of cylindrical or conical work piece. It is performed by revolving the table to the required helix angle, then rotating & feeding the work piece against revolving cutting edges of miling cutter.

(g) Cam miling - Produce cam on miling machine. In this, cam blank is mounted at the end of dividing head spindle & the end mill is held in the vertical miling attachment.

(h) Gang Miling - Produce several surface of work piece simultaneously using a gang of miling cutter.

(i) Plain Miling - Produce flat surface on work piece to other end to complete the one pairs of plain miling operation

(j) Slot Miling - Operation of producing keyways, grooves, slot of varying shapes and sizes called slot miling. It can use any type of miling cutter.

Qc

## Conventional

(a) Chip width start from zero & increase which causes more heat to diffuse into the work-piece & reduce work hardening

(b) Tools rub more at the beginning of the cut causing faster tool wear & decrease tool life.

(c) Chips are carried upward by tooth & fall in front of cutter creating a finish & re cutting chip.

(d) Upward forces created in horizontal milling tend to lift the workpiece, more intricate & expensive work holdings are needed to lessen the lift created.

## Climb Milling

(a) Chip width start from max & decrease so that generated will more likely transfer to the chip.

(b) Creates cleaner shear plane which cause the tool to rub less & increases tool life.

(c) Chips are removed behind the cutter which reduces the chance of re-cutting.

(d) Downward forces in horizontal miling is created that helps hold the workpiece down, less complex work holdings are needed when coupled with these forces.

x ——— x