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LATHE AND MILLING MACHINE

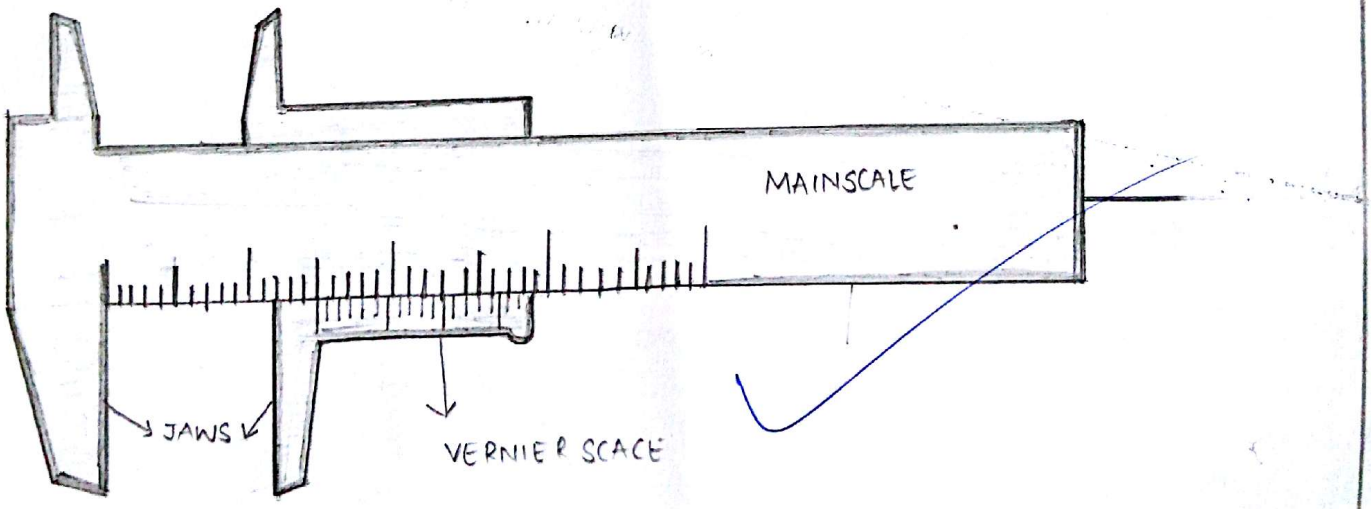
OBJECTIVE :-

To make hexagonal bolt with the help of lathe machine and a milling machine

TOOLS USED :-

1. VERNIER CALLIPERS :-

A measuring instrument consisting of an L-shaped frame with a linear scale along its longer arm and L-shaped sliding attachement with a vernier



2. LATHE MACHINE :-

The lathe is an important and oldest known machine tool in any workshop, which is most widely used for general purposes

The main function of lathe is to remove metal from a piece of work to give it the required shape and size. This is accomplished by holding the work securly and then turning it against cutting tool which removes metal from work in the form of chips.

HEAD STOCK :-

The headstock from which power is transmitted to different parts of a lathe, consists of headstock casting to accomodate all the parts with in it., the main spandle to which work is attached; the work filed into the main spindle; the pulley used to get various spindle speed and back gear arrangement for obtaining a wide range of shower speeds, and certain gears called change wheels used to produce different velocity ratio used for thread cutting.

TAIL STOCK :-

It is for purpose of primarily guiing an outer bearing and support for work being turned on centres. it can be adjusted for alignment or non-alignment with respect to the spindle centre.

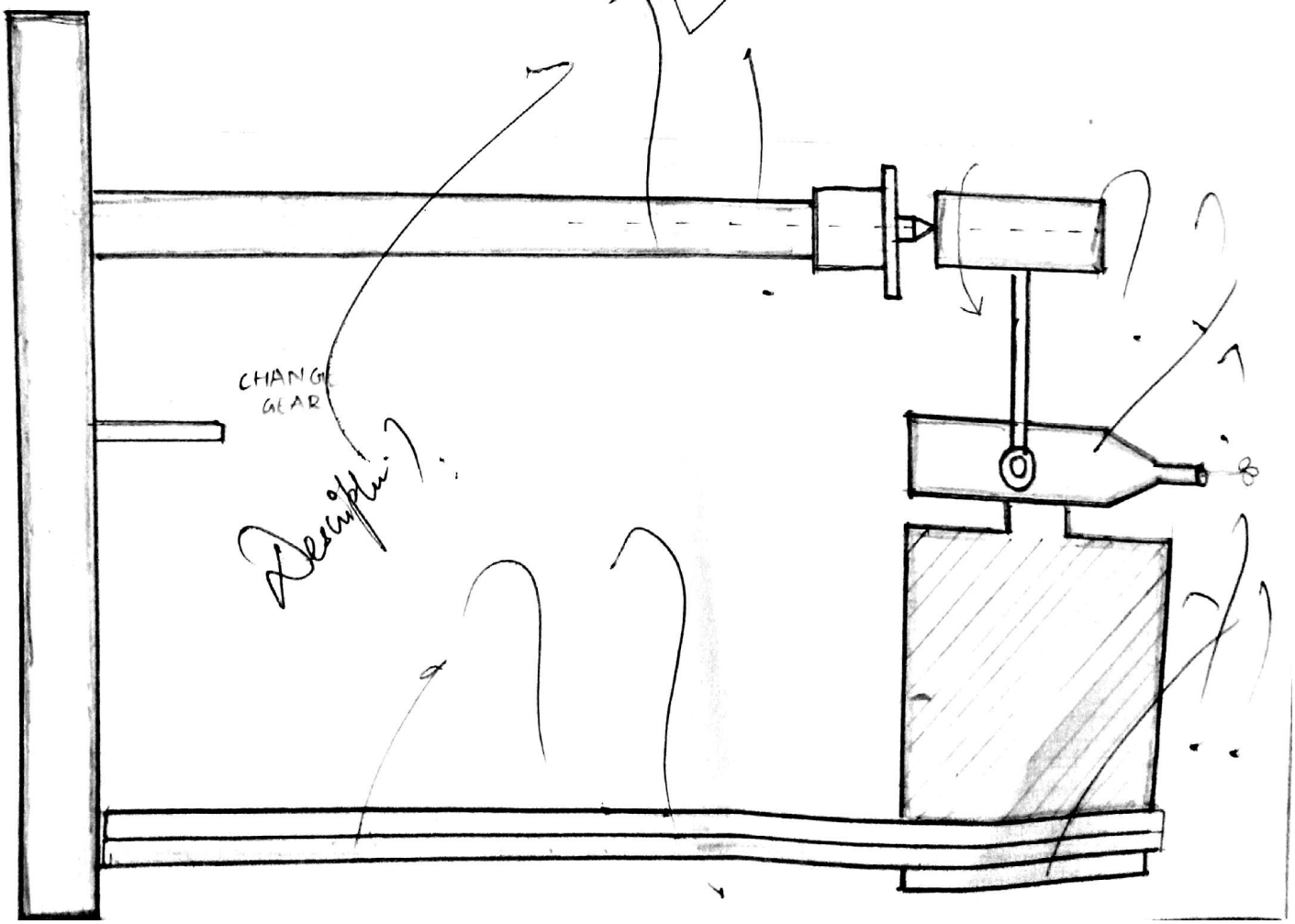
BED :

its the main body of the machine which is usually made by cast iron due to its high compressive strength and high lubrication quality.

CHUCK :

chuck is used to hold the workspace it is bolted on the spindle which rotates the chuck and work piece it has four jaws and three jaw according to the requirment of machine.

$$\frac{\text{lead screw turn}}{\text{Spindle turn}} = \frac{\text{Driver teeth}}{\text{Driven teeth}} = \frac{\text{pitch of work}}{\text{pitch of lead screws.}}$$



LEAD SCREW :

lead screw is situated at the bottom side of the bed which is used to move the carriage automatically during the thread cutting.

CARRIAGE :-

It is used to held and move the tool part on the bed vertically and horizontally. It slides on the guide ways - carriage is made by cast iron

SPINDLE :-

it is main part of the lathe machine which hold and rotates the chuck.

OPERATION PERFORMED :-

FACING :

it is the act of cutting the face which is a planar surface, onto the work piece.

THREAD CUTTING :-

Thread cutting is the process of creating a screw thread. screw threads are produced each time on the work piece.

T Turning :-

it means to produce a conical surface by gradual oreduction in diameter form a cylinderal work piece . it has wide application

Step turning :-

It is similar to straight turning operation . it is done to obtain stepped cylindrical surface.

Making hexagonal head by peripheral milling

We do indexing to divide circular work piece into six equal parts and then all the six parts are milled to an identical flat surface.

PROCEDURE :-

1. A mild steel bar of diameter 25mm and 55mm in length is taken.
2. Hold the job in the chuck properly
3. Tighten the job with a chuck key.
4. hold the single point cutting tool in the tool point.
5. select the appropriate RAM for the job
6. place the cutting in centre of the job

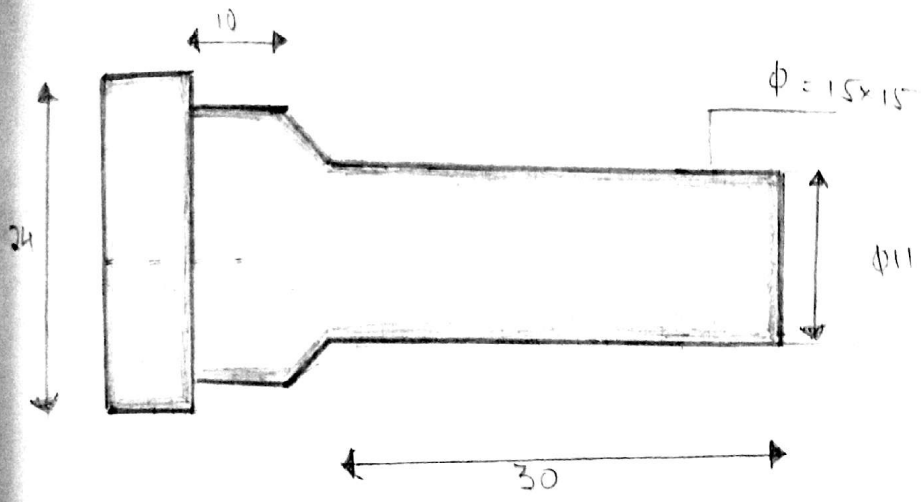
7. Do the facing operation manually with a cross feed. This has to be done to completly fat the surface.

8. Do the straight turning operation with the help of automatic longitudinal feeding mechanism. select proper feed (mm/rev) and depth of cut as per the instruction. we get the required diameter.

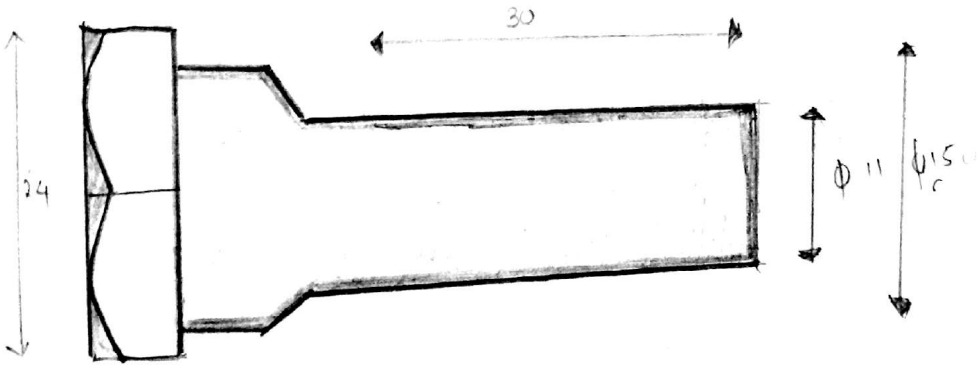
9. Do the step turing with the help of the auto -matic longitudinal feeding mechanism. This has to be done to get the required diameter of the bolt head and length.

10. Do the thread cutting operation with the help of thread cutting tool. This time feed rod has to be dis engaged and lead screw has to be engaged with half nut of the apron. This is completely done automatically also here proper selections of change gear is required.

LATHE JOB



ALL DIMENSIONS ARE IN MM



UNIVERSAL MILLING JOB

ALL DIMENSIONS ARE IN MM

HEAD STOCK

Main spindle bore	42 mm
9 speed range	60 - 2000

THREAD AND FEED STOCK

longitudinal feed	0.044 - 0.662 mm
Metric thread in TPI	0.6 - 7.5 mm
Whitworth thread in TPI	60 - 4 MM

SLIDE AND CARRIAGE

cross slide travel	245 mm
Tool post slide Travel	100 mm

TAIL STOCK

Tail stock Barrel diameter	58 mm
Tail stock Barrel Travel	180 mm

MOTORS

Main motor power	3 kW
Pump motor power	0.06 mm

MILLING MACHINE

OBJECTIVE :-

To make cuts on the heads of the bolt so as to make it hexagonal in shape.

INTRODUCTION :-

Milling is an interrupted cutting operations; the teeth enter and exist the work during each revolution. This subjects the teeth to a cycle of impact force and thermal shock on every revolution. The tool material from a work piece (by advancing or feeding) in a direction at an angle with the axis of the tool. It covers a wide variety of different operation and materials, on scales from small individual parts to large, heavy duty gang milling operation it is one of the most commonly used operations. it is one of the most common shop today for machinery parts to precise sizes and shops.

MILLING MACHINCE OPERATIONS

The hexagonal head of the bolt will be produced by universal milling machine with the help of universal dividing head as an indexing attachment

The cylindrical head has to be divided into six equal division - Each division has to be cut by milling operation.

INDEXING :

it is the operation of dividing the periphery of work in any number of equal parts. This is achieved by universal dividing head - There are several indexing methods available. presently simple indexing will be used for obtaining six division The necessary formula for obtaining index crank movement is as follows

$$\text{Index crank movement} = \frac{40}{N}$$

where N is the number of divisons required, here it is six - The index plate which is attached to the dividing head has the following holes.

Index plate :- 13, 17, 18, 27, 33, 43, 51.

Index crank :- $\frac{40}{6} = 6\frac{2}{3} = 6\frac{12}{18}$

Therefore circle of 18 holes has to be selected - Thus for indexing, 6 complete turn and 12 holes in 18 hole circle of the index plate will have to be moved by index crank.

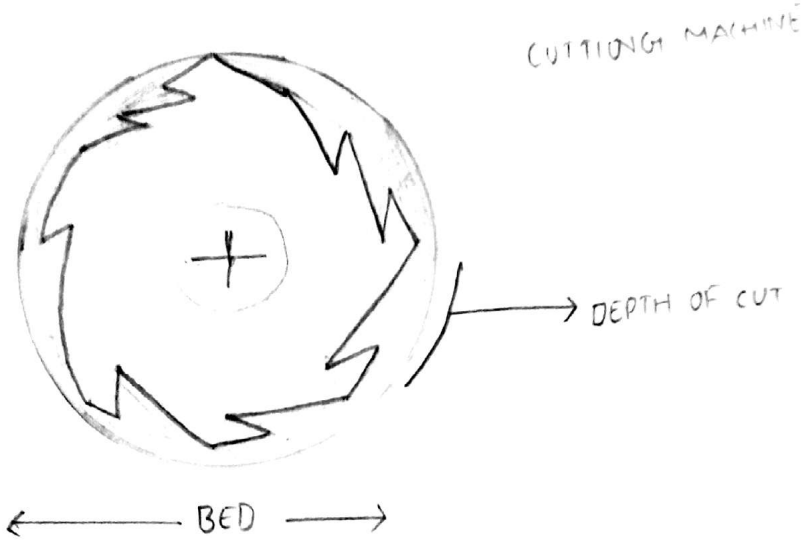
PROCEDURE :-

1) Turn the index plate crank movement 62/3 rotations

2) Hold the job tightly on the dividing head

3) Select proper RPM and feed

4) Do the up milling operation



A

All geared heavy duty type

capacity
6 spindle speed
table working surface
longitudinal travel
cross travel
Vertical travel
Rotarty table
MOTORS :-
Main motor Power
Feed motor Power