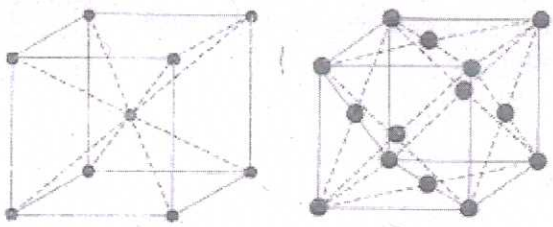
Scoring Indicators

Code :TED (15)-4023

Qn. No.	Scoring Indicators	Split score	Total score
I	**PART –A**		
	1. Heating, Soaking(holding the metal at heating temp.) and Cooling. 2. Continuous chip, discontinuous or segmental chip, continuous chip with built up edge 3. Machining of the end of a work piece to make smooth and flat. 4. Indexing is the operation of dividing the periphery of a work piece into any number of equal parts. 5. The clapper box is hinged to the tool head of a shaper. It swings outward on the return stroke so that the cutting tool lift slightly and clear the work	5 x 1	5
II	**PART-B**		
	1. **BCC**- Body Centered Cubic structure has eight corner atoms and one atom at the center of the cell. BCC structure are chromium, iron, sodium etc. **FCC**-Face Centered Cubic Structure has eight corner atoms and one at the center of each face. Eg. Aluminium, copper, gold etc.  BCC FCC	Fig.1.5+1.5 Theory 1.5+1.5	6
	2. To relieve internal stresses To improve mechanical properties To change in grain size To increase resistance to heat and corrosion To modify electrical and magnetic properties To remove gases To improve weldability To improve machinability	6 points	6
	3. Cutting speed of a tool is the speed at which the cutting edge passes over the material, unit is -m/min Feed is defined as the cutting tool advances per revolution of the work Unit of speed- mm/revolution Depth of cut is the distance between the unfinished surface of the work and the bottom of the cut	3 x 2	6

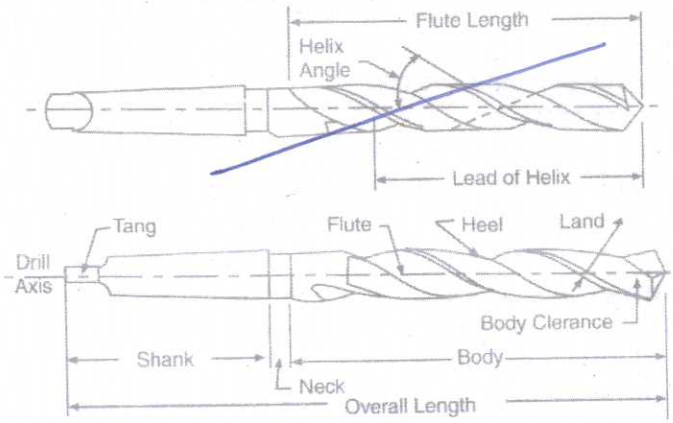
4. Speed lathe, Engine lathe, Bench lathe, Tool room lathe, Capstan and Turret lathe, Special purpose lathe, Automatic lathe

6×1 — 6

5. Indexing plate used in this method has 24 equally spaced holes in a circle. Work piece can be divided into any number of equal divisions out of 2,3,4,6,8,12,24 parts which are the factors of 24.
Equation for the movement of spring loaded pin is 24/N, N=number of equal divisions. If we want to divide the work piece into 8 equal parts , 24/8=3 holes, ie. the pin has to be moved 3 holes before next milling operation.

6

6.



← only this fig.

Fig. 3.28. Details of twist drill

Fig. 4 Parts-2 — 6

7.SHAPER

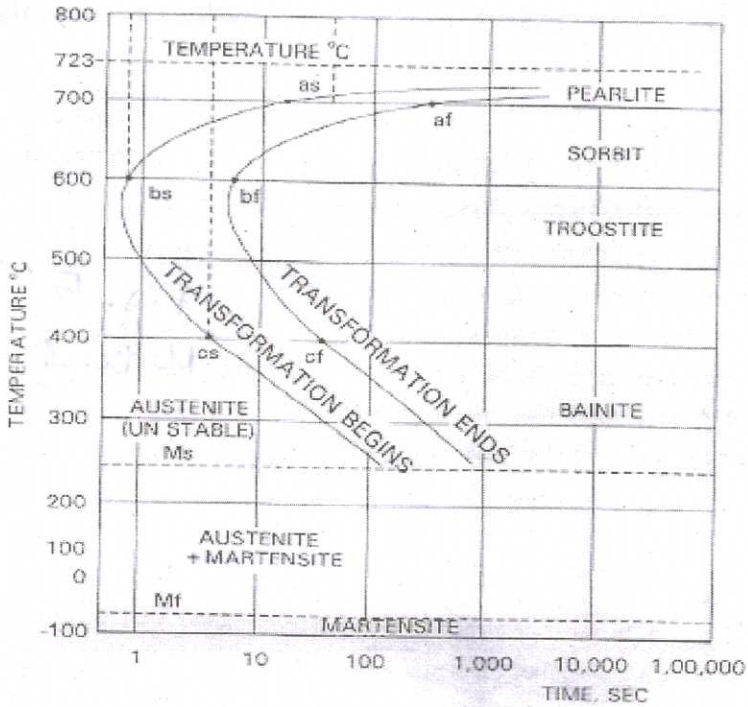
1. Ram holding the tool reciprocates past the work which is held securely to the table
2. Compare to planer , shaper is used for small work
3. Feed is given to the work
4. Only single tool can be used
5. Work setting may be clamped easily and quickly
6. Occupy less floor space

PLANER

1. Work is mounted on table reciprocates past the cutting tool
2. Compare to shaper , planer is used for big work
3. Feed is given to the tool
4. Multiple tool can be used
5. Work setting requires much skill and long time
6. Occupy large floor space

4 points 4×1½ — 6

Code :

Qn. No.	Scoring Indicators	Sp sc
III. a	 Fig. 4.6 TTT Diagram TTT diagram describes the decomposition of austenite in a given steel As in the figure points a_s and a_f represents the beginning and end of austenite decomposition at 700^0c. The same points at 600^0c 400^0c are b_s, b_f, and c_s, c_f respectively. The curve 1 and 2 are drawn through all the points indicating the beginning and end of austenite transformation Curve 1 , passing through a_s ,b_s, c_s represents austenite begins to decompose. Curve 2, passing through a_f, b_f, c_f represents austenite decomposition is completed Fig-6 Explm-3 } 9
b	• The process powder metallurgy are quite and clean • Articles of any shape can be manufactured • The dimensional accuracy and surface finish are better • No material is wasted as scrap • High production rate • Many parts which can not be produced by other methods can be produced • Highly qualified or skilled labors are not required • Hard to process materials such as diamond can be converted into usable components. 6x1 - 6	

OR

IV a

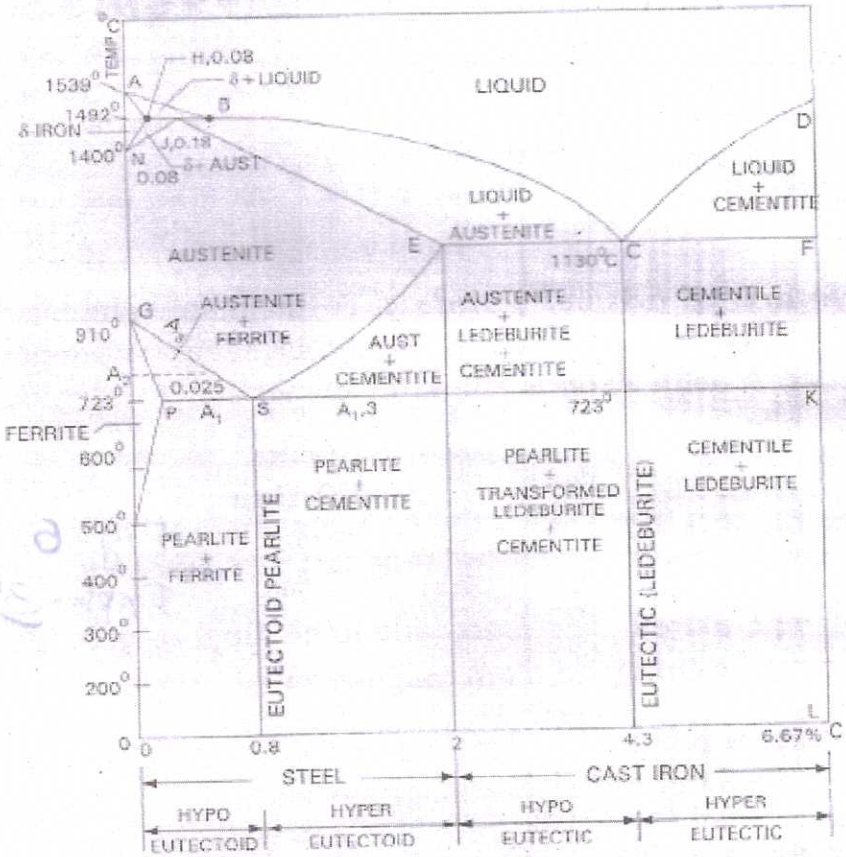


Fig. 4.4 Iron-Carbon Equilibrium Diagram

Fig-5
Marking-4 } 9

b

1. **Annealing** is a heat treatment process

It consists of

Heating the steel slightly above the critical point
Holding at this temp. for a considerable period
Then cool the metal slowly

Purpose – to soften the metal, improve machinability, refine grain size, increase or restore ductility and toughness

2. Carburizing

- In this process the component is placed in a heat resistant alloy box filled with charcoal(carburizer) mixed with
  Carbonates of barium, calcium or sodium (known as energizers)
- The energizer is used to accelerate the process and thus increases the concentration of carbon monoxide
- The component is heated close to and above its critical temperature
- At this temperature oxygen combines with carbon to form carbon monoxide(CO) and this CO decomposes to CO2 and C

3+3 - 6.

V a

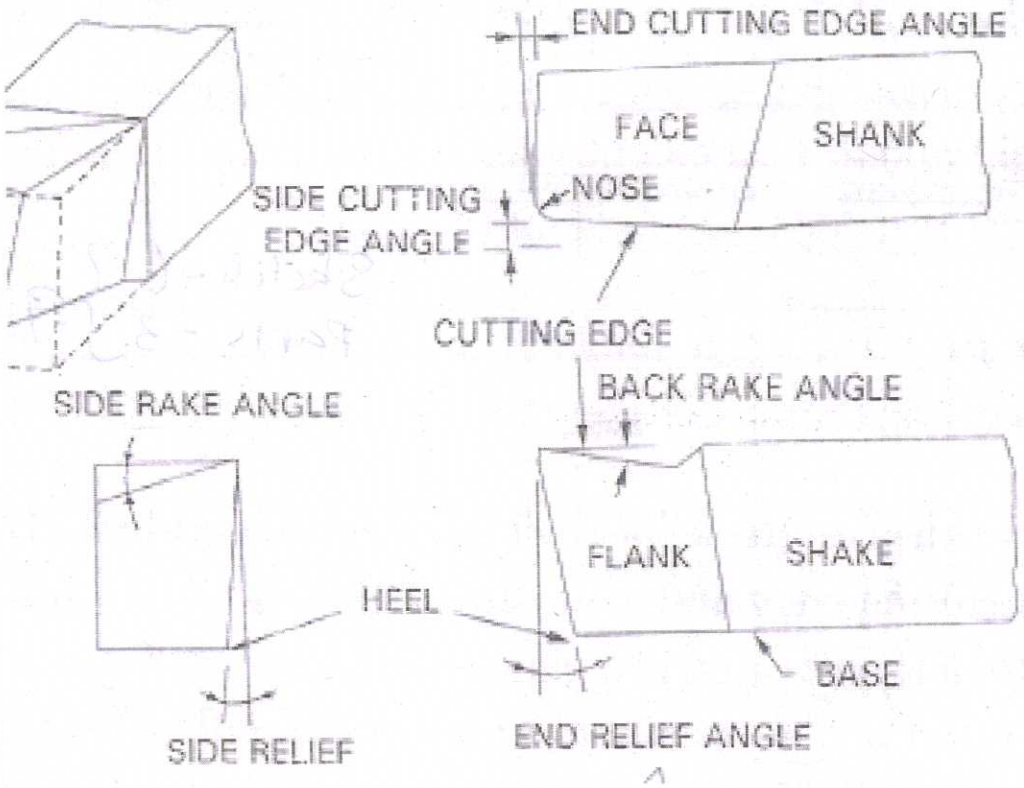


Fig. 5
Marking - 4 } 9

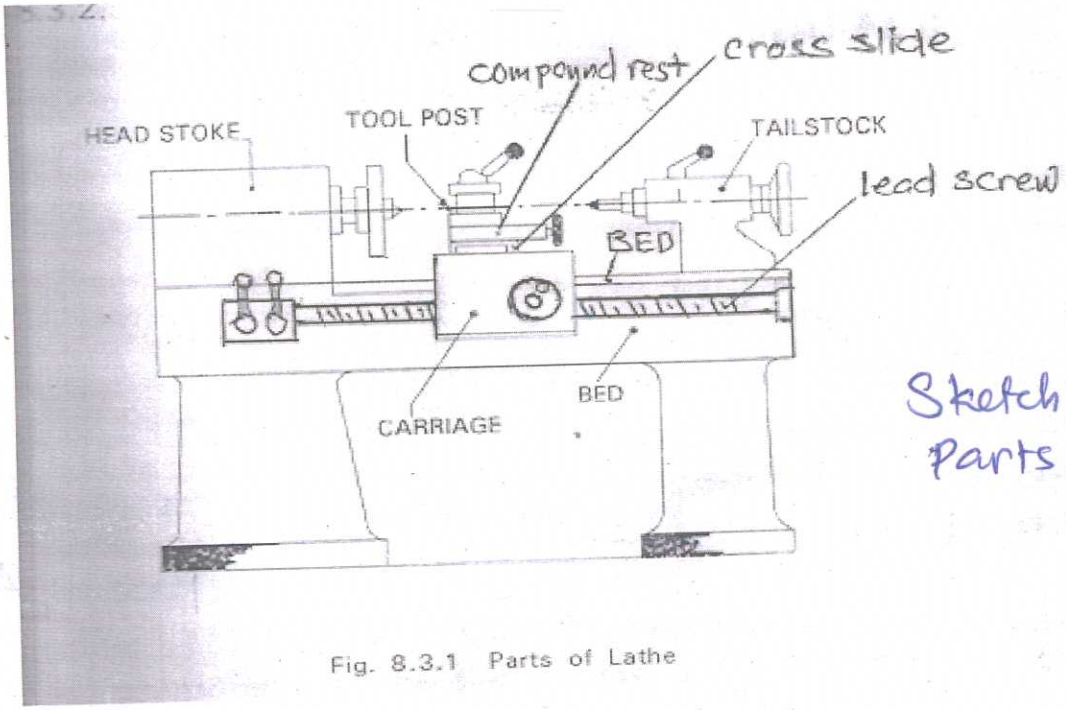
b

To cool the work piece
To cool the tool
To lubricate and reduce the friction
To protect the finished surface from corrosion
To break chips into small pieces
To wash the chips away from the
To improve surface finish

6 × 1 = 6

OR

VI a



Sketch - 6
Parts - 3 } 9

Fig. 8.3.1 Parts of Lathe

b

- Lathe centers
- Chucks
- Driving plates
- Face plates

Lathe dog
Mandrels
Steady rest
Follower rest

6 × 1 = 6

UNIT-III

VII a The different parts of a drilling machines are shown in the figure.
The head containing electric motor ,V-pulleys and V-belt which transmit rotary motion to the drill spindle at a number of speeds.
Spindle rotates and moves up and down.
Drill chuck holding drill bit is held at the end of the spindle.
An adjustable work table is supported on the column, can be moved both vertically and horizontally.
Base supports the drill press structure and column is a round or box section which rests on the base and supports the head and the table.

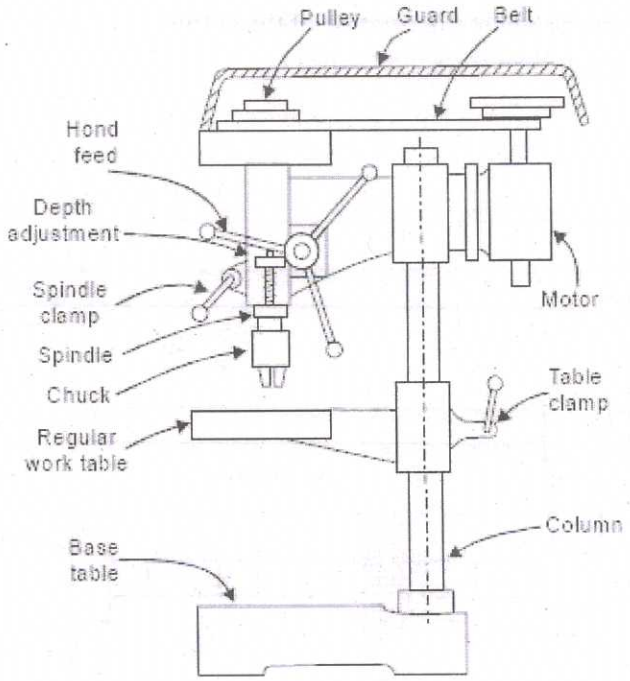
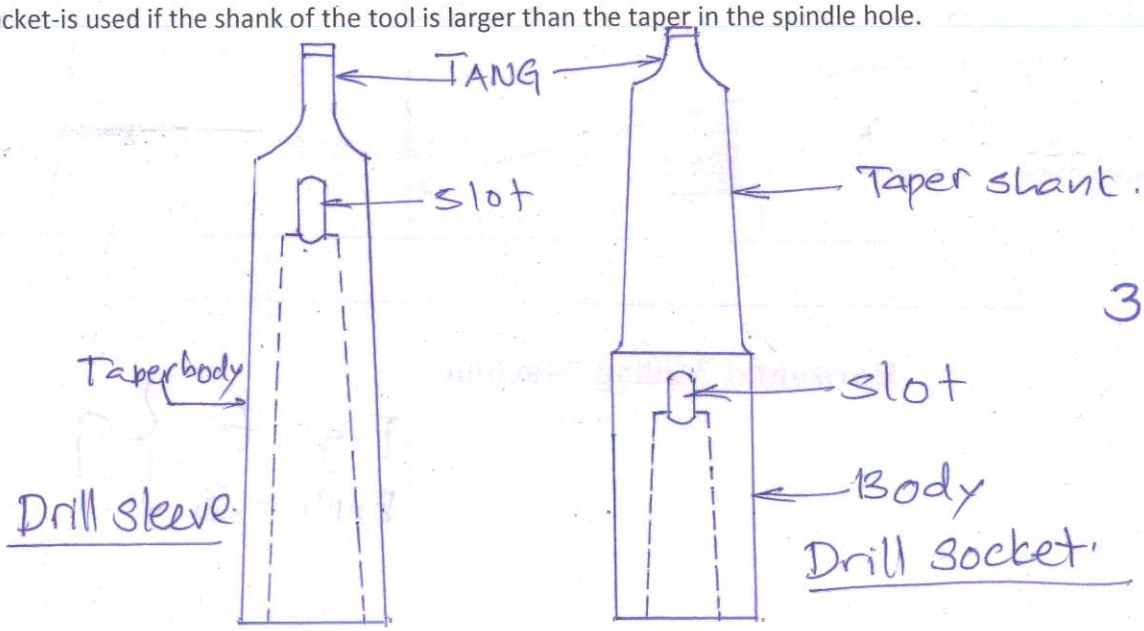


Fig. 5 } 9
Explm-3 }

b The drill spindle is suitable for holding only one size of drill bit shank. Sleeve and Socket is used to hold different types of drill bits.

Sleeve-is used if the shank of the tool is smaller than the taper in the spindle hole.

Socket-is used if the shank of the tool is larger than the taper in the spindle hole.

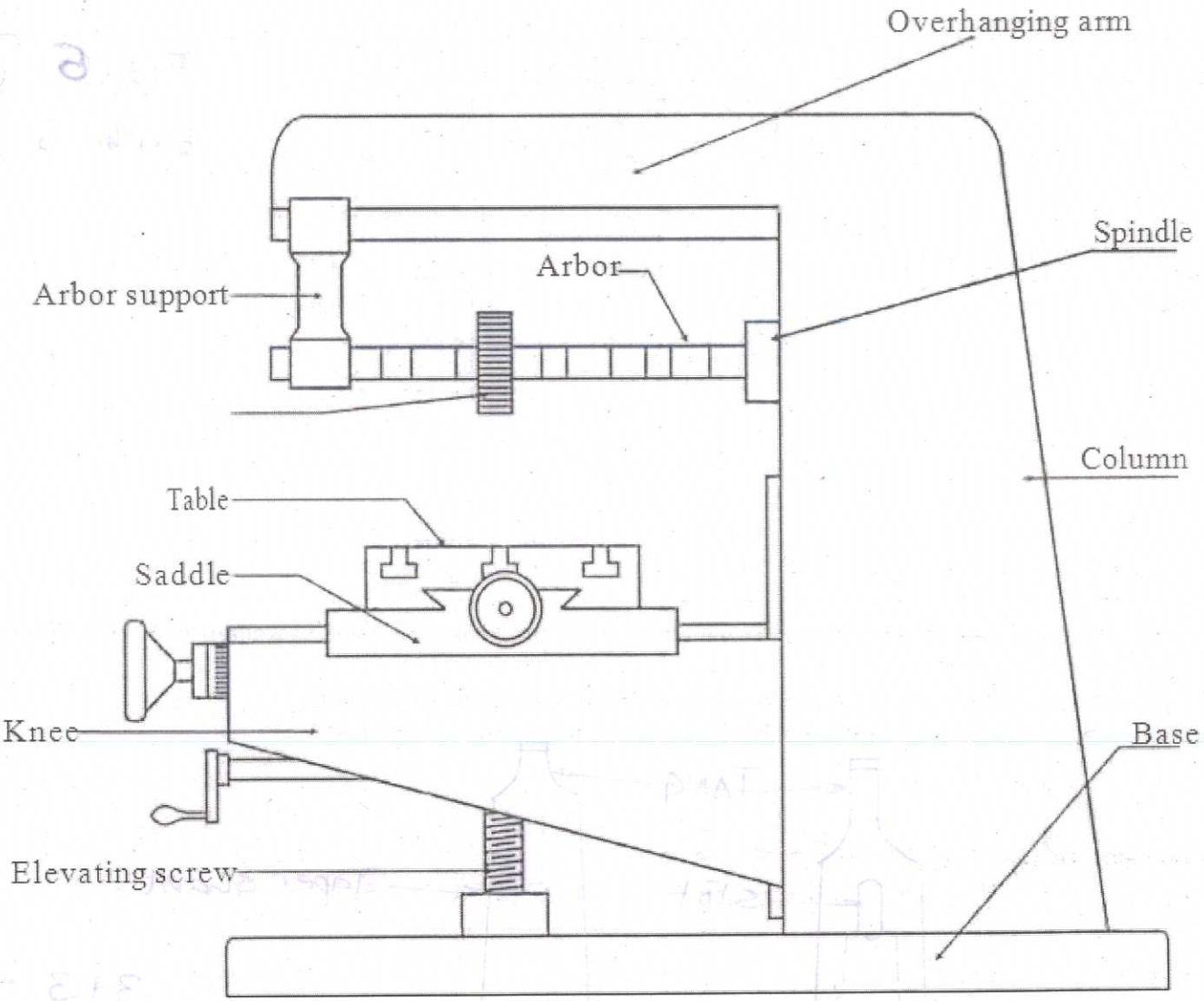


3+3 - 6

OR

VIIIa

The main parts of a horizontal milling machine are shown in figure.
Milling cutter is held in the arbor which rotates in horizontal axis.
Table is mounted on the saddle which mounted on the knee moves up and down .
Work is fixed on table and moves against the rotation of the cutter.
Base supports the column houses the driving mechanism.



Horizontal Milling Machine

Fig. 6 } 9.
Explm-3 }

5

b

Plain milling cutter

- Cylindrical in shape having teeth on their circumference.
- These are used to produce flat surface parallel to the axis of rotation.
- The cutter teeth may be straight or helical .
- Cutter diameter from 16 to 160 mm and width range from 20 to 160 mm.

3+3-6

End milling cutter

- The end mills have cutting teeth on the end as well as on the periphery of the cutter.
- Teeth may be straight or helical.
- Used for cutting slots , accurate holes etc.

UNIT-IV

IX a

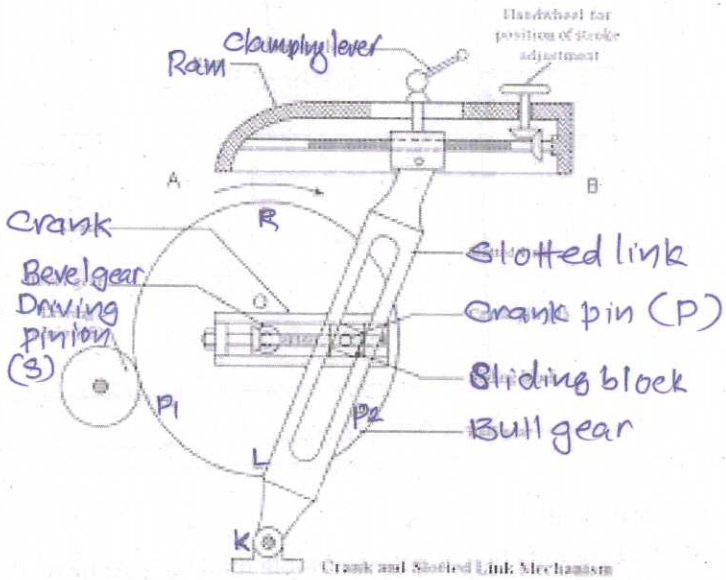


Fig. 6 } 9.
Expln. 3.

Fig. shows the crank and slotted link mechanism.
An electric motor runs the driving pinion causes the rotation of the bull gear.
A sliding block which is mounted upon the crank pin P is fitted within the slotted link is pivoted about the point K.
The upper end of the slotted link is connected to the ram which reciprocates horizontally.
When the bull gear rotates the sliding block also rotates causes the oscillatory motion of the slotted link which causes the reciprocating motion of the ram.
Time taken the sliding block to move the distance P2LP1 (backward motion of the ram) is less than the time taken to move the distance P1RP2 (forward motion of the ram). And thus quick return motion is occurred.

b

- The maximum stroke length
- Diameter of rotary table
- Maximum travel of saddle and cross slide.
- Type of drive used

Power rating of motor
Net weight of machine
Number and amount of feeds
Floor area required

6x1 - 6

OR

X a

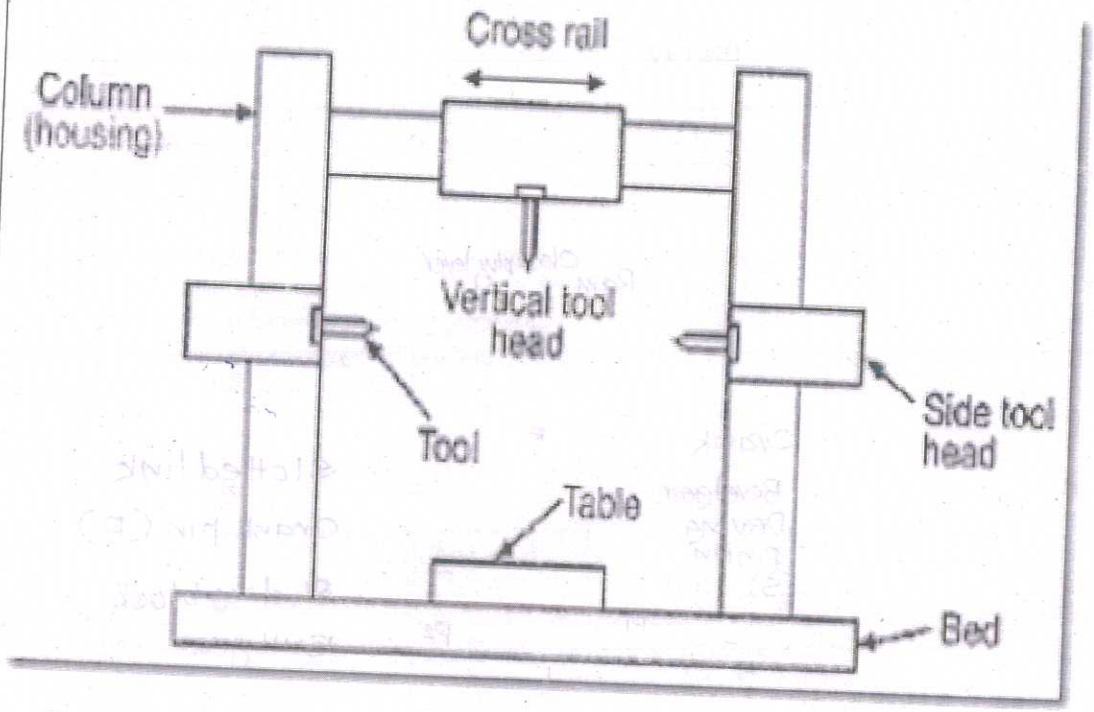


Fig. 5 } 9
Expln. 4 }

1. **BED AND TABLE**
   The bed is a long heavy base and table made of cast iron
   The top surface of table is accurately machined and T slots are provided to clamp work pieces
2. **HOUSING**
   Housings are the rigid and upright column like castings, located near the centre on each side of the base. Guide ways are provided on its faces for the up and down movement of cross rail
3. **CROSS RAIL**
   A horizontal member and moves up and down through the guide ways provided on the column., for accommodating work piece of different heights.
4. **TOOL HEADS**
   Two tool heads are mounted on cross rail and one on each of the vertical housing and one on each of the vertical housing.
   Work is mounted on the table which reciprocates and passes the cutting tool and thus cutting takes place.

b

- Shaper vice
- Clamps and stop pins
- T-bolts and step blocks

Angle plate
V-block
Special fixtures

6x1 - 6.