



17402

SHREE DATTA POLYTECHNIC COLLEGE, DATTANAGAR

Maharashtra State Board of Technical Education

Model Answer Class Test No.- I

Course Name: Mechanical Engineering
Subject: Manufacturing processes (17402)

Course Code: ME4G
Marks: 25

Q1

a) List down basic parts of Centre lathe.

- | | |
|---------------|-----------------------------|
| 1. Bed | 4. Carriage |
| 2. Head stock | 5. Feed mechanism |
| 3. Tailstock | 6. Thread cutting mechanism |

b) Define forging. Write its advantages.

forging is defined as the plastic deformation of metals at elevated temperatures into a predetermined size or shape using compressive forces exerted through some means of hand hammers, small power hammers, die, press or upsetting machine.

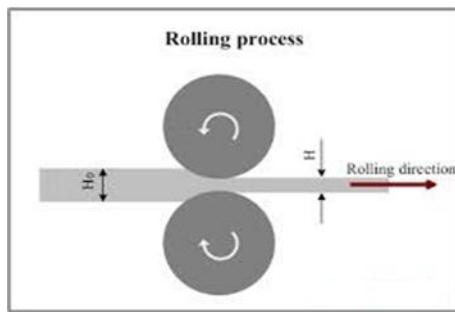
Advantages of forging(any two)

1. Forged parts possess high ductility and offers great resistance to impact and fatigue loads.
2. Forging refines the structure of the metal.
3. It results in considerable saving in time, labor and material as compared to the production of similar item by cutting from a solid stock and then shaping it.
4. Forging distorts the previously created unidirectional fiber as created by rolling and increases the strength by setting the direction of grains.
5. Because of intense working, flaws are rarely found, so have good reliability.
6. The reasonable degree of accuracy may be obtained in forging operation.
7. The forged parts can be easily welded.

c) Explain principle of Rolling.

The process of plastically deforming metal by passing it between the rolls is known as rolling.

The work is subjected to high compressive stresses from squeezing action of rolls.



The frictional force between metal and rolls is responsible for drawing the metal into the rolls. The thickness of work is reduced by compressive forces exerted by two opposing rolls.

d) What are the various operations performed on a Drilling machine.

- | | |
|-------------------|-------------------|
| 1. Drilling | 2. Reaming |
| 3. Boring | 4. Counter boring |
| 5. Countersinking | 6. Spot facing |
| 7. Tapping | 8. Lapping |
| 9. Grinding | 10. Trepanning. |

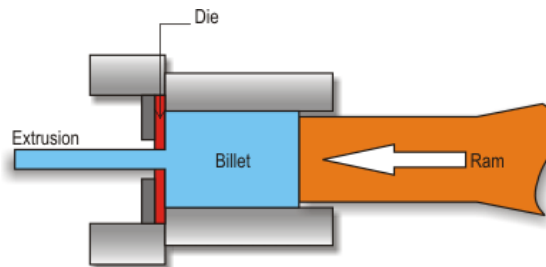
e) Explain the function of Flute on a drill.

Flutes are the grooves in the body of the drill, **which provide lips, allow the removal of chips, and permit cutting fluid to reach the lips.**

Q2

a) Explain principle of extrusion? Writes its application.

Extrusion is the process by which a block/billet of metal is reduced in cross section by forcing it to flow through a die orifice under high pressure.



Applications- automotive and construction applications, window frame members, railings, aircraft structural parts.

b) Cutting speed- The speed at which the metal is removed by a tool from work.

$$V = DN/1000 \text{ m/min}$$

Depth of cut- It is a perpendicular distance measured from machined surface to non machined surface.

$$t = (D_1 - D_2) / 2$$

Where D_1 - diameter of work before machining.
 D_2 - diameter of work after machining.

c) What is mean by tool signature?

Convenient way to specify tool angles by use of a standardized abbreviated system is known as tool signature or tool nomenclature. It indicates the angles that a tool utilizes during the cut.

Tool signature 0-7-6-8-15-16-0.8

1. Back rake angle (0°)
2. Side rake angle (7°)
3. End relief angle (6°)
4. Side relief angle (8°)
5. End cutting edge angle (15°)
6. Side cutting edge angle (16°)
7. Nose radius (0.8 mm)

d) What is taper? How it is calculated.

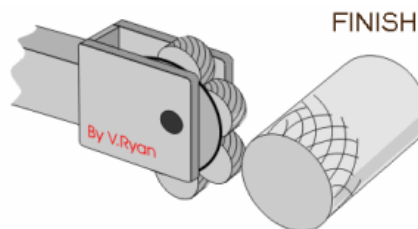
A taper is defined as a uniform increase or decrease in diameter of a piece of work measured along its length.

$$\alpha = \tan^{-1}(D - d)/2l \quad \text{where}$$

D- Larger dia. of taper in mm.
d- Smaller dia. of taper in mm.
l- Length of taper in mm
Half taper angle

e) Explain knurling process.

Knurling is a operation of producing (embossing) a diamond shaped pattern on the surface of the work piece.



- Purpose-
- a) To provide an effective gripping surface on a work.
 - b) To make shining on surface (better look) .

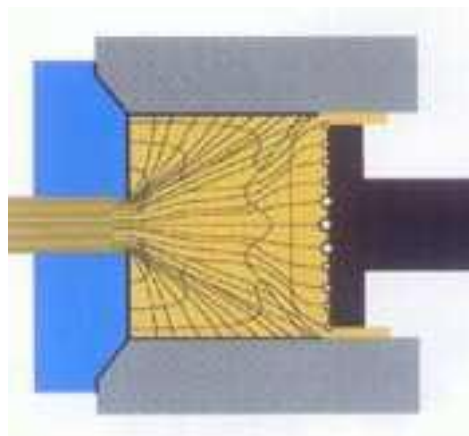
Q3

a) **Compare open die and closed die forging process.**

	Open die forging	Closed die forging
1	Forging carried out between flat dies	w/p is deformed between two die which carry impressions of desired shape.
2	Prefer for Job or batch production	Prefer for Mass production
3	Close dimensional tolerance not produced.	Close dimensional tolerance achieved.
4	Skilled workers necessary.	Accuracy depends on die.

b) **Explain forward extrusion process with neat sketch.**

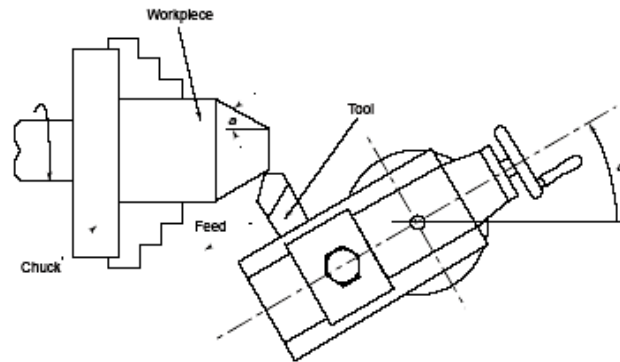
- In this method, the heated metal billet is placed in to the die chamber and the pressure is applied through ram.
- The metal is extruded through die opening in the forward direction, i.e. the same as that of the ram.
- In forward extrusion, the problem of friction is prevalent because of the relative motion between the heated metal billet and the cylinder walls. To reduce such friction, lubricants are to be commonly used.



c) Name the taper turning method on lathe. Explain anyone.

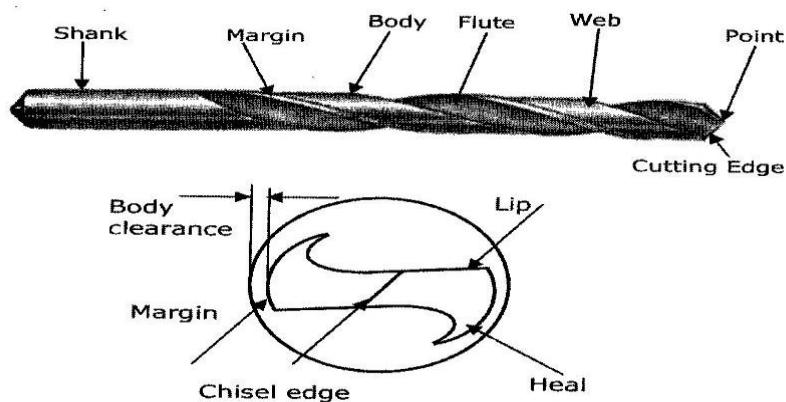
1. By swiveling the compound rest,
2. By setting over the tailstock centre,
3. By a broad nose form tool,
4. By a taper turning attachment,
5. By combining longitudinal and cross feed in a special lathe

Taper turning by swiveling the compound rest



This method employs the principle of taper turning by rotating the workpiece on the lathe axis and feeding the tool at an angle to the axis of rotation of the workpiece. The tool is mounted on the compound rest, is attached to a circular base, graduated in degrees, which may be swiveled and clamped at any desired angle. Once the compound rest is set at the desired half taper angle, rotation of the compound slide will cause the tool to be fed at an angle and generate the corresponding taper

d) Draw a labeled sketch of twist drill.



e) Differentiate between Hot working processes and cold working processes.

	Hot working processes	Cold working processes
1	Hot working is carried out above recrystallisation temperature and below the melting point.	Cold working is carried out below recrystallisation temperature.
2	No internal or residual stresses are set-up in the metal in hot working.	In this process internal or residual stresses are set-up in the metal.
3	Close tolerance can not be maintained	Better tolerance can be easily maintained.
4	Surface finish of this process is poor	Surface finish of this process is better.
5	Due to higher deformation temperatures, the stress required to cause deformation much less.	The stress required for deformation is much higher.
6	If cracks and blow bores are present in the metal, they are finished through hot working.	In cold working the existing cracks propagate and new cracks may develop.
7	Facilitate uniformity of composition in the metal	Loss of uniformity of metal composition and thus affects the metal properties.