1. What are the types of surfaces that could be produced using plain cylindrical grinders?
   Plain cylindrical parts, cylindrical parts, cylinders, tapers, shoulders, fillets, cams, crankshaft etc.

2. State the abrasives used in manufacture of grinding wheels?
   a, corundum (75 to 90% crystalline Al₂O₃ + IRON OXIDE) b, Diamond
   Artificial abrasives:
   a, Aluminium oxide
   b, silicon oxide

3. What do you mean by loading of grinding wheels?
   During the operation, the chips formed get entrapped in the inner granular space of abrasive particles. This is called loading.
The surface of the wheel becomes smooth and gets a glassy appearance. This is known as glazing wheel.

4. What is meant by dressing and truing?

Dressing is the process of loading and breaking away the glazed surface so that new sharp abrasive particles are again present to work for efficient cutting.

Truing is the process of trimming the cutting surface of the wheel to true with the axis.

5. Mention four important factors that influence the selection of grinding wheel?

1. constant factors
   i. physical properties of material to be ground
   ii. Amount and rate of stock to be removed.
   iii. Area of contact.
   iv. Type of grinding machine

2. variable Factors
   i. work speed.
   ii. wheel speed.
   iii. condition of the grinding machine
   iv. personal factor

6. What for lapping is used?

a. Removing small amounts of material from the surfaces of tools.

b. Removing small defects and surface cracks left during previous operations
c. Eliminating small distortion.

7. What is meant by honing?

An abrading process of finishing previously machined surfaces is known as honing.

8. What are the advantages of honing process?

1. Simple process which can be done on any general purpose machines such as lathes and drilling machines.
2. This process can be applied for both internal cylindrical and flat surfaces.
3. Honing enables the maximum stock removing capacity out of entire surface finishing operations.

9. What is meant by dressing and truing?

Dressing is the process of loading and breaking away the glazed surface so that new sharp abrasive particles are again present to work for efficient cutting.

Truing is the process of trimming the cutting surface of the wheel to run true with the axis.

10. What is roller burnishing process?

Roller burnishing is a method of cold working metal surfaces in which hardened sphere or cylindrical roller is pressed against the work to be processed. For example, in roller burnishing on a lathe, the burnishing tool is moved across the surface to be spanned.
UNIT IV

ABRASIVE PROCESS AND BROACHING

PART - B

1. What are the various methods of centerless grinding and each briefly?

- Centerless grinding is a form of grinding where there is no collet or pair of centers holding the object in place. Instead, there is a regulating wheel positioned on the opposite side of the object to the grinding wheel. A work rest keeps the object at the appropriate height but has no bearing on its rotary speed. The workblade is angled slightly towards the regulating wheel, with the workpiece entering above the centerlines of the regulating and grinding wheel; this means that high spots do not tend to generate corresponding opposite low spots, and hence the roundness of parts can be improved. Centerless grinding is much easier to combine with automatic loading procedures than centered grinding; throughfeed grinding, where the regulating wheel is held at a slight angle to the part so that there is a force feeding the part through the grinder, is particularly efficient.

2. Explain the external cylindrical grinding process and surface grinding process?

The cylindrical grinder is a type of grinding machine used to shape the outside of an object. The cylindrical grinder can work on a variety of shapes; however the object must have a
central axis of rotation. This includes but is not limited to such shapes as a cylinder, an ellipse, a cam, or a crankshaft.

Cylindrical grinding is defined as having four essential actions:

1. The work (object) must be constantly rotating
2. The grinding wheel must be constantly rotating
3. The grinding wheel is fed towards and away from the work
4. Either the work or the grinding wheel is traversed with respect to the other.

While the majority of cylindrical grinders employ all four movements, there are grinders that only employ three of the four actions.

3. Explain the gear cutting by a formed tool?
4. Explain the operations of horizontal broaching machine with neat sketch?

- Broaching machines are relatively simple as they only have to move the broach in a linear motion at a predetermined speed and provide a means for handling the broach automatically. Most machines are hydraulic, but a few specialty machines are mechanically driven. The machines are distinguished by whether their motion is horizontal or vertical. The choice of machine is primarily dictated by the stroke required. Vertical broaching machines rarely have a stroke longer than 60 in (1.5 m).
- Vertical broaching machines can be designed for push broaching, pull-down broaching, pull-up broaching, or surface broaching. Push broaching machines are similar to an arbor press with a guided ram; typical capacities are 5 to 50 tons. The two ram pull-down machine is the most common type of broaching machine. This style machine has the rams under the table. Pull-up machines have the ram above the table; they usually have more than one ram. Most surface broaching is done on a vertical machine.

- Horizontal broaching machines are designed for pull broaching, surface broaching, continuous broaching, and rotary broaching. Pull style machines are basically vertical machines laid on the side with a longer stroke. Surface style machines hold the broach stationary while the workpieces are clamped into fixtures that are mounted on a conveyor system. Continuous style machines are similar to the surface style machines except adapted for internal broaching.

- Horizontal machines used to be much more common than vertical machines, however today they represent just 10% of all broaching machines purchased. Vertical machines are more popular because they take up less space.

5. Explain Abrasive Processes?

- Abrasive machining processes can be divided into two categories based on how the grains are applied to the workpiece.

- In bonded abrasive processes, the particles are held together within a matrix, and their combined shape determines the geometry of the finished workpiece. For example, in grinding the particles are bonded together in a wheel. As the grinding wheel is fed into the part, its shape is transferred onto the workpiece.

- In loose abrasive processes, there is no structure connecting the grains. They may be applied without lubrication as dry powder, or they may be mixed with a lubricant to form a slurry. Since the grains can move independently, they must be forced into the workpiece with another object like a polishing cloth or a lapping plate.

- Common abrasive processes are listed below.
Fixed (bonded) abrasive processes

- Grinding
- Honing, superfinishing
- Tape finishing, abrasive belt machining
- Buffing, brushing
- Abrasive sawing, Diamond wire cutting, Wire saw
- Sanding

Loose abrasive processes

- Polishing
- Lapping
- Abrasive flow machining (AFM)
- Hydro-erosive grinding
- Water-jet cutting
- Abrasive blasting
- Mass finishing,

6. Differentiate between gear forming and generating?

- In this type, the cutting edges are formed to the shape of the gear tooth space.
- The formed end mill cutter is held on the spindle of a vertical milling machine.
- The blank is held in a dividing head and fed against the rotating cutter. The axis of both the cutter and gear blank is perpendicular are inclined to each other.
- Gear generation is based on the fact that any two involute gears of the same module will mesh together.
- Here, one of the meshing gear is made as the cutter. The other gear rotates and reciprocates along the width.
7. Explain neet sketch surface grinding machine?