Unit IV

Gear Generation
Types of Gears and their characteristics

a) According to Configuration

Configuration of (a) external and (b) internal gears
(b) According to axes of transmission

(a) Straight toothed

(b) Helical and

(c) Double helical gears
Bevel gears

- Transmitting motion between intersecting shafts (axes)

Bevel gears; (a) straight toothed, (b) spiral and hypoid gears
Non-parallel non-intersecting shafts

(a) worm and worm wheel, (b) hypoid gear and (c) spiral gears.
Specification Of Gears

- Type; e.g. spur, bevel, spiral etc.
- Material (Ferrous, Non Ferrous, Non metal)
- Size or dimensions (z, m, θ)
- Geometry
- Special features, if any
Manufacture Of Gears

Performing Gear Blanks

• Casting
  o Sand casting
  o Metal mould casting
  o Die casting
  o Investment casting
  o Shell mould casting
  o Centrifugal casting
Manufacture of gears by rolling

Gear blank

Production of teeth of spur gears by rolling
Manufacture of gears

- Powder metallurgy
- Blanking in Press tool
- Plastic moulding
- Extrusion process
- Wire EDM
Production of Gear Teeth by Machining

- Forming
  - Shaping, planing and slotting
  - Milling
- Generation
• Fast production of teeth of spur gears

cutting tools
Finishing of Gear Teeth

- Gear shaving
- Gear rolling or burnishing
- Gear teeth grinding
- Gear teeth grinding on forming principle
- Gear teeth grinding on generation principle
- Gear teeth finishing by lapping
Gear shaving cutters of (a) spur gear type (b) rack and (c) worm type
Cutting teeth of gear shaving (a) cutter and its (b) action
Gear teeth finishing by form grinding

Gear teeth grinding on generation principle
Bevel gear Generation

• Pre forming of blanks
  - Casting or Forging followed by machining

• Straight toothed bevel gear
  - Forming, Generation

• Teeth of spiral and hypoid bevel gears
Production of teeth of straight toothed spur gear by forming
Production of teeth of straight toothed spur gear by generation