UNIT -1

Type of Transmission System

1. Electrical Transmission Systems

a. AC (Alternating Current) Transmission

- **High Voltage AC (HVAC)**: Used for long-distance power transmission.
- **Low Voltage AC**: For local and domestic power distribution.
- **Applications**: Power grids, industrial plants, residential areas.
- **Advantages**: Easier to transform voltage, lower installation cost.

b. DC (Direct Current) Transmission

- **High Voltage DC (HVDC)**: Used for very long distances, underwater cables, or connecting unsynchronized grids.
- **Applications**: Offshore wind farms, intercontinental energy transmission.
- **Advantages**: Reduced losses, no reactive power issues.

2. Mechanical Transmission Systems

- Transfer mechanical power from a motor or engine to a load.

a. Gear Transmission

- **Types**: Spur, helical, bevel, worm, and planetary gears.
- **Applications**: Automotive gearboxes, industrial machines.
- **Advantages**: Precise speed and torque control, high efficiency.

b. Belt and Pulley Transmission

- **Types**: Flat belts, V-belts, timing belts.
- **Applications**: Conveyor systems, compressors.
- **Advantages**: Cost-effective, handles misalignment.

c. Chain and Sprocket Transmission

- **Applications**: Bicycles, motorcycles, conveyor belts.
- **Advantages**: High torque transmission, durable.

d. Shaft Transmission

- **Types**: Solid and hollow shafts.
- **Applications**: Automotive drive shafts, turbines.
- **Advantages**: Simple and robust.

3. Fluid Power Transmission Systems

- Use fluids (liquid or gas) to transfer energy.

a. Hydraulic Transmission

- **Applications**: Heavy machinery, aircraft controls, presses.
- **Advantages**: High power density, precise control.

b. Pneumatic Transmission

- **Applications**: Automation, packaging systems, pneumatic tools.
- **Advantages**: Lightweight, safe in hazardous environments.

4. Hybrid Transmission Systems

- Combine mechanical, electrical, and fluid systems for efficient power transfer.
- **Applications**: Hybrid vehicles, modern industrial machines.
- **Advantages**: Optimized efficiency and performance.

5. Optical Transmission Systems

- Use light (laser or optical fibers) for transmitting data and energy.
- **Applications**: Telecommunications, data centers, advanced sensors.
- **Advantages**: High-speed transmission, minimal energy loss.

6. Wireless Power Transmission Systems

- Use electromagnetic waves for energy transfer without physical connections.
- **Types**: Inductive coupling, resonant inductive coupling, microwave transmission.
- **Applications**: Electric vehicle charging, consumer electronics.
- **Advantages**: Convenience, no cables required.