KPCL – AE & JE Mechanical Syllabus

Assistant Engineer (AE – B.E. Level)

1. Engineering Mechanics

- Laws of motion
- Equilibrium
- Friction
- Centroid
- Moment of inertia
- Simple machines

2. Strength of Materials (SOM)

- Stress and strain
- Bending moment and shear force
- Torsion
- Columns and struts
- Strain energy
- Mohr’s circle

3. Theory of Machines (TOM)

- Kinematics and dynamics of machines
- Gear trains
- Governors and flywheels
- Balancing of rotating and reciprocating masses
- Vibrations

4. Thermodynamics

- Laws of thermodynamics
- Properties of pure substances
- Thermodynamic cycles (Otto, Diesel, Rankine)
- Entropy
- Refrigeration and air conditioning

5. Fluid Mechanics (FM)

- Properties of fluids
- Bernoulli’s theorem
- Flow through pipes
- Boundary layer theory
- Dimensional analysis
- Hydraulic turbines and pumps

6. Engineering Materials

- Properties and testing of materials
- Ferrous and non-ferrous metals
- Heat treatment processes
- Composite and modern materials

7. Machine Design

- Design of shafts, keys, and couplings
- Bearings and gears
- Brakes and clutches
- Fasteners
- Pressure vessels

8. Workshop Technology

- Fitting, carpentry, smithy, foundry, and welding practices
- Tools and safety measures

9. Production / Manufacturing Engineering

- Metal cutting and tool life
- Lathe, milling, drilling operations
- Casting and welding processes
- Metal forming and machining principles

10. Heat Transfer

- Conduction
- Convection
- Radiation
- Heat exchangers

11. Industrial Engineering

- Work study and time study
- Inventory control and EOQ
- Production planning and control
- Operations research (Simplex, CPM, PERT)

12. Automobile / Power Plant Engineering

- I.C. engines and combustion
- Boilers and turbines
- Compressors
- Power plants (thermal, hydro, nuclear)

Junior Engineer (JE – Diploma. Level)

1. Engineering Mechanics

- Laws of motion
- Equilibrium
- Friction
- Centroid
- Moment of inertia
- Simple machines

2. Strength of Materials (SOM)

- Stress and strain
- Bending moment and shear force
- Torsion
- Columns and struts
- Strain energy

3. Theory of Machines (TOM) / Mechanics of Machines

- Kinematics and dynamics of machines
- Gear trains
- Balancing of rotating and reciprocating masses

4. Thermodynamics

- Laws of thermodynamics
- Properties of pure substances
- Thermodynamic cycles (Otto, Diesel, Rankine)
- Entropy
- Refrigeration and air conditioning

5. Fluid Mechanics (FM)

- Properties of fluids
- Bernoulli’s theorem
- Flow through pipes
- Hydraulic turbines and pumps

6. Engineering Materials

- Properties and testing of materials
- Ferrous and non-ferrous metals
- Heat treatment processes
- Composite and modern materials

7. Machine Design

- Design of shafts, keys, and couplings
- Bearings and gears
- Brakes and clutches
- Pressure vessels

8. Workshop Technology

- Fitting, carpentry, smithy, foundry, and welding practices

9. Production / Manufacturing Engineering

- Metal cutting and tool life
- Lathe, milling, and drilling operations
- Casting and welding processes
- Metal forming and machining principles

10. Heat Transfer

- Conduction
- Convection
- Radiation

11. Industrial Engineering

- Work study and time study
- Inventory control and EOQ
- Production planning and control

12. Automobile / Power Plant Engineering

- I.C. engines and combustion
- Boilers and turbines
- Compressors
- Power plants (thermal, hydro, nuclear)