Junior Engineer

1. Electrical Engineering Syllabus

- **Basic Electrical Engineering**:
  - Electric Circuits: Kirchhoff's laws, network theorems, transient and steady-state analysis.
  - Electromagnetic Fields: Maxwell's equations, electromagnetic waves, and transmission lines.
- **Electrical Machines**:
  - DC machines, transformers, synchronous machines, induction motors, and generators.
- **Power Systems**:
  - Generation, transmission, and distribution of electrical power.
  - Power system protection, fault analysis, load flow, voltage control, and power factor improvement.
- **Control Systems**:
  - Feedback control, transfer functions, stability analysis, Bode plots.
- **Electrical Measurements and Instrumentation**:
  - Measuring instruments, transducers, and sensors.
- **Power Electronics**:
  - Rectifiers, inverters, and converters, and their applications.

2. Mechanical Engineering Syllabus

- **Engineering Mechanics**:
  - Forces, moments, equilibrium, and motion.
- **Strength of Materials**:
  - Stress-strain, bending, shear force and bending moment diagrams, deflection of beams.
- **Thermodynamics**:
  - Laws of thermodynamics, heat engines, refrigeration, and air conditioning.

- **Fluid Mechanics**:
  - Properties of fluids, fluid statics, fluid dynamics, Bernoulli's equation.
- **Manufacturing Technology**:
  - Metal cutting, welding, casting, forming, and machining processes.
- **Machine Design**:
  - Design of machine elements such as gears, bearings, and shafts.
- **Heat Transfer**:
  - Conduction, convection, radiation, heat exchangers.

3. Civil Engineering Syllabus

- **Structural Analysis**:
  - Force and displacement methods, bending moment, shear force diagrams.
- **Construction Materials**:
  - Properties of materials, concrete technology, mix design.
- **Geotechnical Engineering**:
  - Soil mechanics, foundation design, bearing capacity of soils.
- **Surveying**:
  - Leveling, GPS, total station, maps, and measurements.
- **Environmental Engineering**:
  - Water supply and sewage treatment, air pollution, waste management.
- **Transportation Engineering**:
  - Highway design, traffic engineering, and materials used in road construction.
- **Hydraulics**:
  - Fluid properties, open channel flow, water distribution systems.

4. General Knowledge and Aptitude

- **General Knowledge**:
  - Current affairs, particularly related to Tamil Nadu.
  - History, geography, and culture of Tamil Nadu and India.
  - General science and technology.
- **Aptitude Section**:
  - **Numerical Ability**: Percentages, ratios, time and work, time and distance, simple and compound interest.

- **Logical Reasoning**: Series, analogy, coding-decoding, and puzzles.
- **Verbal Ability**: English grammar, vocabulary, reading comprehension.

5. General Study Tips for Preparation

- **Technical Section**: Focus on core subjects from your engineering discipline. Use standard textbooks and study guides.
- **Aptitude**: Practice solving arithmetic, logical reasoning, and data interpretation questions.
- **General Knowledge**: Stay updated with current affairs and focus on Tamil Nadu-specific history, geography, and politics.