

**REFERENCE SYLLABUS FOR UNFIRED BOILER
FOURTH CLASS POWER ENGINEER
EXAMINATION CANDIDATES**

3½ Hours
Multiple Choice
Examination

- A. Elementary Thermodynamics
 - Basic thermodynamic concepts,
 - Temperature and thermal expansion,
 - specific, sensible and latent heat,
 - thermodynamics of steam,
 - steam tables

- B. Acts And Regulations
 - knowledge of the Power Engineers Act and its applicable regulations
 - Knowledge of the Boiler and Pressure Vessel Regulations
 - Knowledge of the Technical safety Act

- C. Plant Safety
 - Costs and effects of workplace injuries
 - Personal protective equipment
 - Isolation of mechanical and electrical equipment
 - Confined space entry
 - Safety Committees

- D. Plant Fire Protection
 - Fire fundamentals and procedures
 - Fires and extinguishing methods
 - Portable fire extinguishers; construction and operation
 - Electrical fires

- E. Piping and Valves
 - Materials; sizes and identification
 - Piping, pipe fittings and connections
 - Expansion joints, bends, support, hangers and insulation
 - Drainage; separators, traps, water hammer
 - Valve types; construction and application

- F. High Pressure Boiler Parts and Fittings
 - Safety and relief valves
 - Blow-down, Safety and Procedures

- G. Pumps
 - Pumps
 - Pumping theory.
 - Pump operation and maintenance
 - Centrifugal pumps; start-up, operation and shut-down

- H. Controls, and instrumentation
 - Instrumentation terms and definitions
 - Methods of process measurement
- I. Reboiler Construction and Operation
 - Description of Reboiler
 - Parts and Construction of Reboiler
 - Operation of Reboiler
- J. Industrial Environmental
 - Power Plant Pollutants
 - Cooling Towers
 - Industrial Noises
- K. Feedwater Treatment
 - Internal;
 - External; and.
 - Knowledge of PH, Sludge, Scale formation, Caustic and Corrosive Damage
- L. Electricity
 - Electrical terms, properties, measurements and calculations
 - Electrical metering devices; voltmeter, ammeter, ohmmeter and wattmeter
 - Conductors and insulators
 - Transformers
 - Electrical distribution; circuits, breakers, switches and fuses
- M. Boiler Maintenance
 - Basic hand Tools
 - Lifting
 - Rigging
 - Tube Replacement Tools
 - Basic Boiler Repair
- N. Types Of Plants
 - Pulp and paper Plant Processes