

**REFERENCE SYLLABUS FOR UNFIRED BOILER RESTRICTED  
FOURTH CLASS POWER ENGINEER**

**EXAMINATION CANDIDATES**

**Part "A"**

**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, interpolation, basic chemical and physical properties.

**B. Acts**

- i. Thorough knowledge of the Power Engineers Act and its applicable regulations
- ii. Thorough knowledge and understanding of the applicable ASME and CSA codes

**C. Plant Safety**

- i. Costs and effects of workplace injuries
- ii. Personal protective equipment
- iii. Isolation of mechanical and electrical equipment
- iv. Confined space entry
- v. Safety Committees

**D. Plant Fire Protection**

- i. Fire fundamentals and procedures
- ii. Fires and extinguishing methods
- iii. Portable fire extinguishers; construction and operation
- iv. Electrical fires

**E. Piping and Valves**

- i. Materials; sizes and identification
- ii. Piping, pipe fittings and connections
- iii. Expansion joints, bends, support, hangers and insulation
- iv. Drainage; separators, traps, water hammer
- v. Valve types; construction and application

**F. High Pressure Boiler Parts and Fittings**

- i. Safety and relief valves
- ii. Blow-down, Safety and Procedures

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**EXAMINATION CANDIDATES**

**Part "B"**

**3½ Hours  
Multiple Choice  
Examination**

**A. Pumps**

- i. **Pumps**
  - a. Pumping theory
  - b. Pump operation and maintenance
  - c. Centrifugal pumps; start-up, operation and shut-down

**B. Controls, instrumentation and computers**

- i. Instrumentation terms and definitions
- ii. Methods of process measurement
- iii. Basic control loop components
- iv. Types of computers; principles, software programs, languages, applications, components
- v. Introductory process computer concepts
- vi. Input and output devices, data recording and storage

**C. Reboiler Construction and Operation**

- i. Description of Reboiler
- ii. Parts and Construction of Reboiler
- iii. Operation of Reboiler

**D. Industrial Environmental (Due Diligence)**

**E. Feedwater Treatment**

- i. Internal;
- ii. External; and
- iii. Knowledge of PH, Sludge, Scale formation, Caustic and Corrosive Damage

**F. Electricity**

- i. Electrical terms, properties, measurements and calculations
- ii. Power and Work
- iii. Electrical metering devices; voltmeter, ammeter, ohmmeter and wattmeter
- iv. Conductors and insulators
- v. Transformers
- vi. Electrical distribution; circuits, breakers, switches and fuses