

## REFRIGERATION PLANT OPERATOR

### SYLLABUS

#### GENERAL INFORMATION

This Syllabus is intended to assist candidates in their preparation for writing an examination. It contains the recommended body of knowledge required. It is strongly advised that, before undertaking this Examination, the candidate completes an appropriate study course and is familiar with operation of boilers in general. These courses are offered by various educational institutions in Saskatchewan.

#### EXAMINATION INFORMATION

- Exam Type:** *70 questions multiple choice*
- Writing Time:** *1.5 hrs*
- Exam Materials:** *The Boiler and Pressure Vessel Act, 1999  
The Boiler and Pressure Vessel Regulations (effective Jan 1,  
2018) CSA B52-03 Boiler, Pressure Vessel and Pressure Piping  
Code Non programmable calculator*
- Passing Grade:** *65%*

Note:

- The candidate must provide picture ID to the Examiner prior to the examination.
- No cell phone or any electronic communication devices are allowed to be brought into the examination room.
- The items referenced above must be shown to the examiner for approval. • No other reference material is allowed.
- Important: If your calculator is programmable, you must reset it in the company of the examiner so that the examiner is sure that all memories are clear. Or the examiner may request that you remove the battery to erase all memory. This may be done during your examination time, so be aware that you may have less time to complete your exam. If the memories do not clear by resetting the calculator or by removing the battery, the calculator shall not be used. Also, if your calculator fails to function after reset or battery removal, the examiner is not responsible and you may be at a significant disadvantage.

Please be aware that candidates failing to obtain a passing grade will be required to wait 30 days before they will be eligible to reapply for examination.

## **SYLLABUS INFORMATION**

### ***The Boiler and Pressure Vessel Act & Regulations and Reference Codes***

1. A general knowledge of *The Boiler and Pressure Vessel Act and Regulations*.
2. Operator staffing requirements for refrigeration plants.
3. Duties of an operator or owner as specified by *The Boiler and Pressure Vessel Act*
4. An awareness of the purpose and importance of the CSA and ASME Codes.

### ***Refrigeration***

1. Refrigerant characteristics (identification, classification; thermo and physical properties).
2. Compression refrigeration systems (operating principles, basic, direct, indirect, and packaged systems).
3. Absorption refrigeration systems (operating principles, lithium bromide and ammonia systems).
4. Classification and application of refrigeration compressors (parts and function; compression ratio; volumetric efficiency; capacity).
5. Classification and application of evaporators and condensers (dry, flooded, bare tube, plate surface, fin-tube and shell and tube evaporators; water cooled, air cooled, and evaporative condensers).
6. Operation and maintenance of cooling towers (natural, forced and induced draft, water treatment, corrosion, biological fouling, and wood deterioration).
7. Operating principles and classifications of refrigeration metering devices and capacity control (automatic and thermostatic expansion valves; low pressure and high pressure float valves; capillary tubes; suction throttling; hot gas by-pass; cylinder unloading and by-pass; compressor speed control; evaporator dampers and sectional evaporators).
8. Cycle controls (temperature; pressure; and humidity activated controls; thermostats; solenoid valves; condenser cooling water regulating valves; evaporator pressure regulating valve; low and high pressure cut-off; flow switch; oil system protection devices).
9. Refrigeration accessories (pressure gauges; accumulators; oil separators; strainers and dryers; sight glasses; heat exchangers; pressure relief devices; piping, tubing, and valves; distributor; vibration absorber; purge and charging valves; emergency discharge).
10. Compression refrigeration systems, operation and maintenance (leak testing; evacuating; charging; purging; adding and draining oil; start-up and shut-down procedures; preventative maintenance; trouble shooting; Code requirements; log sheets).

### ***Air Conditioning***

1. Purpose of air conditioning and definition of terms.
2. Categories and operating principles of air handling systems (unitary, central and combined systems).
3. Categories, operating principles and comparisons of heat recovery systems (runaround system, thermal wheel, heat pipe and heat pump).
4. Operating controls (dampers, preheaters, heating humidity, dehumidity, cooling, fan and complete control systems).

***Plant Safety***

1. Electrical safety.
2. Elementary knowledge of artificial respiration, choking treatment manuevers, and prevention of shock.
3. Fire prevention and protection (classification of fires; extinguisher types; application and operation; sprinkler systems; fire and smoke alarms).

***Electricity***

1. Electrical theory
2. Reading and understanding metering devices and basic calculations (volts, amps, watts, kilowatt hours).
3. Trouble shooting (short circuits, grounds, static electricity, motor problems).
4. Electrical equipment (fuses, circuit breakers, motors, transformers, approved appliances).

***End***