ABSA
the pressure equipment safety authority

REFERENCE SYLLABUS

FOR

ICE PLANT OPERATOR

EXAMINATION

November 2022

Edition 2, Revision 2

GENERAL INFORMATION

Introduction:

This syllabus has been approved by the Standardization of Power Engineers Examinations Committee (SOPEEC) and the Association of Chief Inspectors (ACI).

This syllabus is intended to assist candidates studying for the Ice Plant Operator examination.

Recommended Study Program:

It is recommended, that before undertaking the Ice Plant Operator examination, the candidate completes an arena operator course offered through a third party facilitator that specializes in technical training for facility operations.

Application to Undertake Examination:

A candidate must submit an application and the prescribed fee at least five (5) days before the date of examination.

Examination Instructions:

The examination consists of one (1) examination paper with one hundred (100) multiple choice questions, 3 hours duration.

To pass an Ice Plant Operatorexamination, a candidate must obtain at least 65% of the total marks.

A candidate is allowed to use, and may be provided, the following items in the examination room:

- A non-technical English language dictionary;
- CSA B52, Mechanical Refrigeration Code;
- Extract for CSA B51 and CSA B52 Codes;
- Pens and pencils; Non-programmable calculator

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.

1. Acts, Regulations and Codes:

1.1 Relevant Jurisdictional legislation

1.2 CSA B52 (Current edition) Mechanical Refrigeration code

1.3 CSA Z94.4 Selection, Care and Use of Respirators

1.4 CEPA E2 Regulations

2. Administration

2.1 Basic Communication

3. Elementary Science

3.1 Elementary Mathematics

3.2 Elementary Applied Mechanics

3.3 Elementary Thermodynamics

3.4 Elementary Chemistry

3.4.1 Corrosion Inhibitors

3.5 Electrical Principles

4. Safety

4.1 Basic plant Fire protection

4.2 Personal Safety

4.3 Refrigeration Safety

4.3.1 Refrigeration hazard

4.3.2 Gas Detection and Monitoring

4.3.3 Gas Exposure limits

4.4 Electrical safety

4.5 Basic WHMIS

5. Environmental

5.1 Leak Detecting and monitoring

5.2 Environmental reporting (CEPA E2)

5.3 Environmental Impact of refrigerants

6. Principles of Refrigeration

6.1 Types of Refrigerants

6.2 Basic Refrigeration Cycles

6.2.1 Direct

6.2.2 Indirect

7. Refrigeration Equipment and Components

7.1 Compressors

7.2 Oil Separators and Receivers

7.3 Compressor lubrication

7.4 Condensers

7.4.1 Air Cooled

7.4.2 Evaporative

7.4.3 Shell and tube

7.5 Cooling Towers

7.6 Evaporators

7.6.1 Flooded and Dry systems

7.6.2 Shell, Tube, and Plate and Frame evaporators

7.6.3 Chillers

7.6.4 Surge drums

7.7 Metering Devices

7.7.1 Orfices and capillaries

7.7.2 Hand expansion valves

7.7.3 Thermostatic expansion valves

7.7.4 High side floats

7.7.5 Low side floats

7.8 Heating and Cooling Loops

7.8.1 Headers and layouts

7.9 Brine Pumps

7.9.1 Brine pumps

7.9.2 Types of brine

7.9.3 Provision for brine volume change

7.9.4 Brine testing

7.9.4.1 Specific gravity/Hydrometers

7.9.4.2 Acidity and Alkalinity measurement

7.9.4.3 Testing for Ammonia

7.10 Piping, Valves, and Fittings

8. Refrigeration Controls and Instrumentation

8.1 Fundamental measuring devices

8.1.1 Temperature

8.1.2 Pressure

8.1.3 Flow

8.1.4 Level Devices

8.2 Basic Operational controls

8.3 Basic Safety controls

9. Electrical

9.1 Basic function of electrical components

9.2 Dangers of electric motors

9.3 Electrical Metering and Demand

10. Refrigeration System Operation and Maintenance

10.1 Checks

10.1.1 Log books

10.1.2 Check sheets

10.2 Dangers

10.3 Safety Devices and Functions

10.4 Troubleshooting

10.5 Procedures