

APPRENTICESHIP & CERTIFICATION

Study Guide Industrial Electrician




Newfoundland
Labrador

Apprenticeship and Certification

Study Guide

Industrial Electrician

(Based on Red Seal Occupational Standard – RSOS 2016)

Government of Newfoundland and Labrador
Department of Advanced Education, Skills and Labour

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Introduction

This Study Guide has been developed by the Newfoundland and Labrador Department of Advanced Education, Skills and Labour, Apprenticeship and Trades Certification Division, to assist apprentices and trade qualifiers as they prepare to write the Interprovincial (IP) Red Seal Exam. IP Exams are available for all Red Seal trades. For a list of Interprovincial trades please refer to the Department of Advanced Education, Skills and Labour website:

<https://www.aesl.gov.nl.ca/app/trades.html>

Some of the specific goals of this guide are:

- ⇒ to help you understand the skills and knowledge that might be covered on the exam
- ⇒ to help you identify your strengths and weaknesses
- ⇒ to provide organization and structure for a course of study
- ⇒ to provide a list of resources to help you with your study plan
- ⇒ to support and supplement the teaching and learning process

This study guide outlines the theoretical portion of the program. The intent is not to replace technical training provided under the guidance of instructors. Rather, it is a tool to be used in conjunction with formal training.



Exam Process

Before the Exam

You must contact the nearest Apprenticeship and Trades Certification Divisional office to make request to write the IP Red Seal exam (*See Appendix A for a list of regional offices*). Upon approval, the Apprenticeship Program Officer (APO) will notify you of your eligibility to write the exam, and provide you with scheduling information. If you require special accommodations due to a disability or language barrier, please contact your regional office for information on applying for this service.

During the Exam

You must bring:

- personal identification such as a photo or signature ID or valid Newfoundland and Labrador driver's license
- your notification letter

The following will be provided:

- a calculator (*see Appendix B for calculator information*)
- all other items required such as pencils, scrap paper, etc.

Important Note:

Personal cell phones, calculators, or other electronic equipment are NOT allowed into the exam room. If you do bring them, they will be stored away and returned to you when you have completed the exam.

After the Exam

Results will be mailed to you approximately seven to ten days after completion of the exam. All necessary instructions and information will be provided in the results letter.

The percentage mark you obtained will be provided. You will also be given a section by section breakdown, showing how many questions were in each section, as well as the number of questions in each section you completed successfully.

If you are successful in obtaining a 70% or more on your exam, you will be issued a Newfoundland and Labrador Certificate of Qualification with a Red Seal endorsement.

Exam Format

All IP Red Seal exams are written in multiple-choice format. Each exam has between 100 and 150 questions. A multiple choice question consists of a stem (a complete question) followed by four options (A, B, C, D). The stem contains all the information necessary to answer the question. The options consist of the one correct answer and three “distracters.” Distracters are incorrect. (See Appendix C for a sample answer sheet).

IP Red Seal exams contain three types of questions:

Level 1 Knowledge and Recall

Questions at this level test your ability to recall and understand definitions, facts, and principles.

Level 2 Procedural and Application

Questions at this level test your ability to apply your knowledge of procedures to a new situation.

Level 3 Critical Thinking

Questions at this level test your ability to interpret data, solve problems and arrive at valid conclusions.

Level 1 Examples:

1. What does a dashed line between 2 disconnects indicate on a schematic diagram?
 - A. Mechanical interlock.
 - B. Bonding conductor.
 - C. Ground connection.
 - D. Lightning arrester.



2. What do the letters "HRC" on a fuse indicate?

- A. High running current.
- B. Half running capacity.
- C. Half rupture current.
- D. High rupture capacity.



3. When checked with an ohmmeter, a capacitor reads 0 Ω. What is the capacitor's condition?

- A. Open-circuited.
- B. Short-circuited.
- C. Grounded.
- D. Serviceable.



Level 2 Examples:

1. What is the procedure for testing a high pressure sodium (HPS) lamp socket for power?

- A. Use digital VOM to check from centre contact to ground.
- B. Use digital VOM to check from shell to centre contact.
- C. Use analog VOM to check from centre contact to ground.
- D. Use analog VOM to check from shell to centre contact.



2. In addition to wearing safety boots, which combination of personal protective equipment is utilized when working at a switching substation?
- A. Work gloves, anti-glare safety goggles and glow stick.
 - B. Work gloves, face shield and ear plugs.
 - C. Safety gloves, face shield and glow stick.
 - D. Safety gloves, safety goggles and ear plugs.



3. A three-phase delta connected load is single-phasing because of an open winding. What percentage of its original load could be delivered?
- A. 33.30%.
 - B. 50.00%.
 - C. 66.70%.
 - D. 72.30%.



Level 3 Examples:

1. A shop has 6 rows of lighting, each with 42 fixtures. During a lighting retrofit it takes 2 electricians 70 minutes to change 1 fixture. How many electricians are required to change all of the fixtures in a 40 hour time period?
- A. 3.
 - B. 8.
 - C. 13.
 - D. 15.



2. What is the minimum size of TW90 copper conductors required to feed a 230V, 5 hp, single-phase motor located 60 m from the distributor centre, without exceeding a 3% voltage drop?

- A. No. 4 AWG.
- B. No. 6 AWG.
- C. No. 8 AWG.
- D. No. 10 AWG.



3. A -10 V to +10 V temperature transmitter is calibrated to measure from -50°C to +300°. At a temperature of +76°C, what is the expected voltage output from the transmitter?

- A. -3.6 V.
- B. -2.8 V.
- C. +2.5 V.
- D. +4.3 V.



Source of questions:

<http://www.red-seal.ca/s.1mpl.2.2x.1mQ.5.2st.3.4ns-eng.html?tid=123>

Exam Content

Understanding the *Red Seal Occupational Standard (RSOS)*

The Red Seal model has historically been based on the development of the National Occupational Analysis (NOA) which supports the development of multiple-choice format examinations.

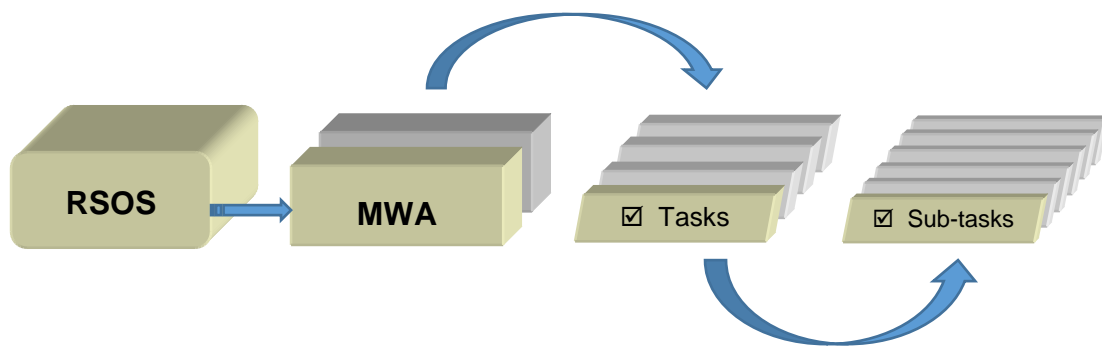
The RSOS was introduced in 2015 and is now taking the place of the NOA. Each RSOS or NOA sets the standard for a Red Seal trade. The Red Seal Inter-provincial Examination is based on the Red Seal Standard.

The new standards provide greater consistency in learning resources and allow for increased industry involvement in the development of these standards. This new model places increases emphasis on apprenticeship training and assessing skills with industry learning objectives, outcomes and performance criteria.

The RSOS for each trade describes the tasks and sub-tasks; skills and knowledge requirements; summary of essential skills; safety information; trends affecting the trade; technical terms; names of tools and equipment; acronyms; learning objectives and outcomes; industry expected performance and essential skills related to each sub-task.

The RSOS is an excellent tool to use as you study for the Red Seal exam. RSOSs can be found at <http://www.red-seal.ca/resources/n.4.1-eng.html>

RSOS material is organized into the following categories: **MWA (Major Working Activity)**. The MWAs are further broken down into **TASKS** (*describes activities within an MWA*) and **SUB-TASKS** (*describe activities within a task – This is what the exam is based on*).

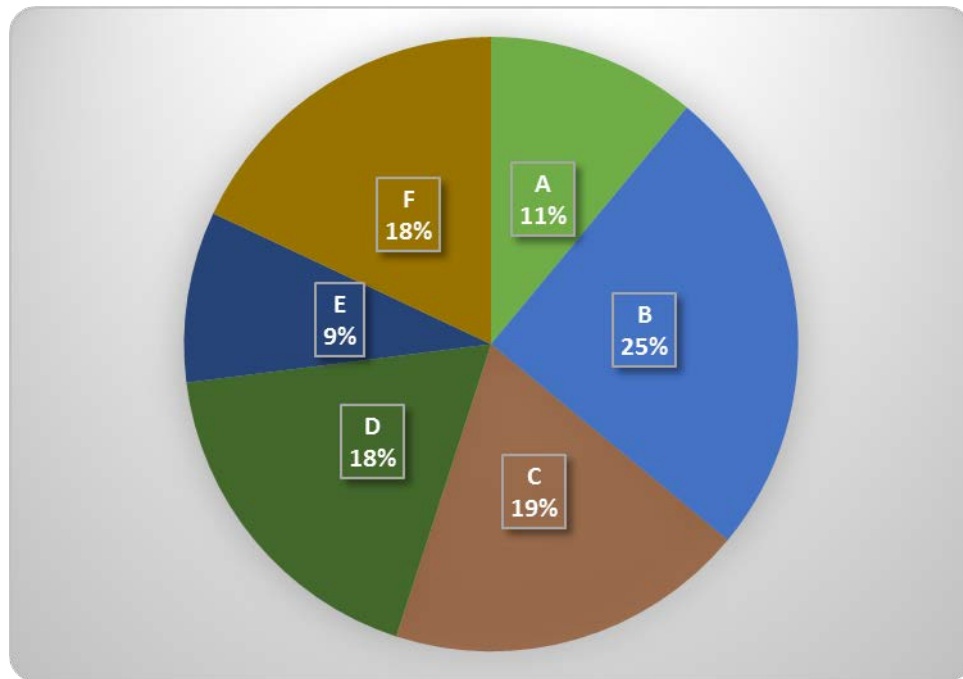


The NOA will continue to be used as the occupational standard for trades that do not yet have an RSOS developed.

RSOS Pie Chart

The RSOS Pie Chart presents the MWA percentages in the form of a pie chart which tells you the approximate number of questions from each MWA. For example, 11% of the questions on the **Industrial Electrician** Exam will be based on **MWA A**.

INDUSTRIAL ELECTRICIAN



MWA Titles			
MWA A	Performs Common Occupational Skills	MWA D	Installs and Maintains Rotating and Non-Rotating Equipment and Control Systems
MWA B	Installs and Maintains Generating, Distribution and Service Systems	MWA E	Installs and Maintains Signaling and Communication Systems
MWA C	Installs and Maintains Wiring Systems	MWA F	Installs and Maintains Process Control Systems

Exam Breakdown

The **Industrial Electrician** exam currently has 100 questions. The following table shows a breakdown of the number of questions that come from each RSOS MWA. It is important to note that the exact number of questions can change at any time. When you are ready to write your exam, you may contact your regional office to verify the number of questions (See Appendix A).

		# of Questions
MWA A	Performs Common Occupational Skills	10
Task 1	Performs safety-related functions	
Task 2	Uses and maintains tools and equipment	
Task 3	Organizes work	
Task 4	Fabricates and installs support components	
Task 5	Commissions and decommissions electrical systems	
Task 6	Uses communication and mentoring techniques	
MWA B	Installs and Maintains Generating, Distribution and Service Systems	25
Task 7	Installs and maintains consumer/supply services and metering equipment	
Task 8	Installs and maintains protection devices	
Task 9	Installs and maintains low voltage distribution systems	
Task 10	Installs and maintains power conditioning systems	
Task 11	Installs and maintains bonding, grounding and ground fault detection systems	
Task 12	Installs and maintains power generating systems	
Task 13	Installs and maintains renewable energy generating and storage systems	
Task 14	Installs and maintains high voltage systems	
Task 15	Installs and maintains transformers	
MWA C	Installs and Maintains Wiring Systems	19
Task 16	Installs and maintains raceways, cables, conductors and enclosures	
Task 17	Installs and maintains branch circuitry and devices	
Task 18	Installs and maintains heating, ventilation and air-conditioning (HVAC) electrical components	
Task 19	Installs and maintains electric heating systems and controls	
Task 20	Installs and maintains exit and emergency lighting systems	
Task 21	Installs and maintains cathodic protection systems	
MWA D	Installs and Maintains Rotating and Non-Rotating Equipment and Control Systems	18
Task 22	Installs and maintains motor starters and control devices	
Task 23	Installs and maintains drives	
Task 24	Installs and maintains non-rotating equipment and associated controls	
Task 25	Installs and maintains motors	
MWA E	Installs and Maintains Signaling and Communication Systems	9
Task 26	Installs and maintains signaling systems	
Task 27	Installs and maintains communication systems	
Task 28	Installs and maintains building automation systems	
MWA F	Installs and Maintains Process Control Systems	19
Task 29	Installs and maintains input/output (I/O) devices	
Task 30	Installs, programs and maintains automated control systems	
Task 31	Installs and maintains pneumatic and hydraulic control systems	
	Total	100

RSOS Sub-tasks

The following *RSOS Task Profile Checklist* outlines the MWAs, tasks and sub-tasks for your trade. The IP Red Seal exam is written to test your knowledge and abilities regarding the sub-tasks in the RSOS. This chart can be used to review your current knowledge. You can review by placing a checkmark (✓) next to those you understand fully.

Place your focus on those you do not understand and study them until you are comfortable with the material. Think of possible questions in that particular content area.

The RSOS also contains a list of “supporting knowledge and abilities” for each sub-task. They are the skills and knowledge you must have to perform a sub-task. The supporting knowledge and abilities identified under each sub-task will be very helpful as you review. The list can be found in the RSOS, on the Red Seal website, for your trade.

**Task Profile Checklist
Based on RSOS 2016
Industrial Electrician**

MWA A: Performs Common Occupational Skills

Task 1: Performs safety-related functions

Sub-Tasks

- Maintains safe work environment
- Uses personal protective equipment (PPE) and safety equipment
- Performs lock-out and tag-out procedures
- Identifies environmental conditions

Task 2: Uses tools and equipment

Sub-Tasks

- Uses common and specialty tools and equipment
- Uses access equipment
- Uses rigging, hoisting and lifting equipment

Task 3: Organizes work

Sub-Tasks

- Interprets plans, drawings and specifications
- Identifies hazardous locations
- Organizes materials and supplies
- Plans project tasks and procedures
- Prepares worksite
- Finalizes required documentation

Task 4: Fabricates and installs support components

Sub-Tasks

- Fabricates support structures
- Installs brackets, hangers and fasteners
- Installs seismic restraint systems

Task 5: Commissions and decommissions electrical systems

Sub-Tasks

- Commissions systems
- Performs shutdown and startup procedures
- Decommissions systems

Task 6: Uses communication and mentoring techniques

Sub-Tasks

- Uses communication techniques
- Uses mentoring techniques

MWA B: Installs and Maintains Generating, Distribution and Service Systems

- Task 7: Installs and maintains consumer/supply services and metering equipment**
 - Installs single-phase consumer/supply services and metering equipment
 - Maintains single-phase consumer/supply services and metering equipment
 - Installs three-phase consumer/supply services and metering equipment
 - Maintains three-phase consumer/supply services and metering equipment
- Task 8: Installs and maintains protection devices**
 - Installs overcurrent protection devices
 - Maintains overcurrent protection devices
 - Installs ground fault, arc fault and surge protection devices
 - Maintains ground fault, arc fault and surge protection devices
 - Installs under and over voltage protection devices
 - Maintains under and over voltage protection devices
- Task 9: Installs and maintains low voltage distribution systems**
 - Installs low voltage distribution equipment
 - Maintains low voltage distribution equipment
- Task 10: Installs and maintains power conditioning systems**
 - Installs power conditioning systems
 - Maintains power conditioning systems
- Task 11: Installs and maintains bonding, grounding and ground fault detection systems**
 - Installs grounding systems
 - Maintains grounding systems
 - Installs bonding systems
 - Maintains bonding systems
 - Installs ground fault detection systems
 - Maintains ground fault detection systems
- Task 12: Installs and maintains power generating systems**
 - Installs alternating current (AC) generating systems
 - Maintains AC generating systems
 - Installs direct current (DC) generating systems
 - Maintains DC generating systems
- Task 13: Installs and maintains renewable energy generating and storage systems**
 - Installs renewable energy generating and storage systems
 - Maintains renewable energy generating and storage systems
- Task 14: Installs and maintains high voltage systems**
 - Installs high voltage systems
 - Maintains high voltage systems
- Task 15: Installs and maintains transformers**
 - Installs extra-low voltage transformers
 - Maintains extra-low voltage transformers
 - Installs low voltage single-phase transformers
 - Maintains low voltage single-phase transformers
 - Installs low voltage three-phase transformers
 - Maintains low voltage three-phase transformers
 - Installs high voltage transformers
 - Maintains high voltage transformers

MWA C: Installs and Maintains Wiring Systems

Task 16: Installs and maintains raceways, cables, conductors and enclosures

Sub-Tasks

- Installs conductors and cables
- Maintains conductors and cables
- Installs conduit, tubing and fittings
- Installs raceways
- Installs boxes and enclosures
- Maintains conduit, tubing, fittings, raceways, boxes and enclosures

Task 17: Installs and maintains branch circuitry and devices

Sub-Tasks

- Installs luminaires
- Maintains luminaires
- Installs wiring devices
- Maintains wiring devices

Task 18: Installs and maintains heating, ventilation and air-conditioning (HVAC) electrical components

Sub-Tasks

- Connects power to HVAC systems and associated equipment
- Installs HVAC controls
- Maintains HVAC electrical components

Task 19: Installs and maintains electric heating systems and controls

Sub-Tasks

- Installs electric heating systems and controls
- Maintains electric heating systems and controls

Task 20: Installs and maintains exit and emergency lighting systems

Sub-Tasks

- Installs exit and emergency lighting systems
- Maintains exit and emergency lighting systems

Task 21: Installs and maintains cathodic protection systems

Sub-Tasks

- Installs cathodic protection systems
- Maintains cathodic protection systems

MWA D: Installs and Maintains Rotating and Non-Rotating Equipment and Control Systems

Task 22: Installs and maintains motor starters and control devices

- Sub-Tasks
- Installs motor starters
- Maintains motor starters
- Installs motor control devices
- Maintains motor control devices

Task 23: Installs and maintains drives

- Sub-Tasks
- Installs AC drives
- Maintains AC drives
- Installs DC drives
- Maintains DC drives

Task 24: Installs and maintains non-rotating equipment and associated controls

- Sub-Tasks
- Installs non-rotating equipment and associated controls
- Maintains non-rotating equipment and associated controls

Task 25: Installs and maintains motors

- Sub-Tasks
- Installs single-phase motors
- Maintains single-phase motors
- Installs three-phase motors
- Maintains three-phase motors
- Installs DC motors
- Maintains DC motors

MWA E: Installs and Maintains Signaling and Communication Systems

Task 26: Installs and maintains signaling systems

- Sub-Tasks
- Installs fire alarm systems
- Maintains fire alarm systems
- Installs security and surveillance systems
- Maintains security and surveillance systems

Task 27: Installs and maintains communication systems

- Sub-Tasks
- Installs communication systems
- Maintains communication systems

Task 28: installs and maintains building automation systems

- Sub-Tasks
- Installs building automation systems
- Maintains building automation systems

MWA F: Installs and Maintains Process Control Systems

Task 29: Installs and maintains input/output (I/O) devices

Sub-Tasks

- Installs discrete input/output (I/O) devices
- Maintains discrete input/output (I/O) devices
- Installs analog input/output (I/O) devices
- Maintains analog input/output (I/O) devices

Task 30: Installs, programs and maintains automated control systems

Sub-Tasks

- Installs automated control systems
- Maintains automated control systems
- Programs automated control systems
- Optimizes system performance

Task 31: Installs and maintains pneumatic and hydraulic

Sub-Tasks

- Installs pneumatic control systems
- Maintains pneumatic control systems
- Installs hydraulic control systems
- Maintains hydraulic control systems

Create a Study Plan

As you prepare for your exam, it is important to plan a schedule. The following two tables will help you stay on track.

The first table is a **“Weekly Study Plan.”** In this table list the areas you will focus your study for each day. You should include items you need to review as well as items you need to study. Remember, more time will be needed for study in areas you find difficult, whereas you may only require review in areas you are more familiar with. As you work through the RSOS sub-task list you can start to fill in this table.

The second table is a **“Study Time Table.”** It is important to create a study schedule where you determine the best days of the week and times of day for you to study.

Print several copies of these tables and fill out for each week of study. It is important to stick to your study schedule.

Weekly Study Plan for Week of: _____

	Area of Study 1	Area of Study 2	Area of Study 3	Area of Study 4	Area of Study 5	Area of Study 6
Mon.						
Tues.						
Wed.						
Thu.						
Fri.						
Sat.						
Sun.						

Study Time Table for Week of: _____

	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8:00 AM - 9:00 AM							
9:00 AM - 10:00 AM							
10:00 AM - 11:00 AM							
11:00 AM - 12:00 Noon							
12:00 Noon - 1:00 PM							
1:00 PM - 2:00 PM							
2:00 PM - 3:00 PM							
3:00 PM - 4:00 PM							
4:00 PM - 5:00 PM							
5:00 PM - 6:00 PM							
6:00 PM - 7:00 PM							
7:00 PM - 8:00 PM							

Resources - Websites

Study information can be drawn from a variety of sources. A sample list of study materials (websites and books) is provided below. These and other helpful resources may be found in a local college bookstore, on the internet, or at your place of employment. You may also be able to borrow them from an apprentice or journey person in your trade.

Study Strategies and Exam Preparation Guide

The *Study Strategies & Exam Preparation Guide* is meant to be used in conjunction with this study guide. It provides direction and information on such areas as study habits, test preparation and test taking techniques.

Exam Preparation Guide: https://www.aesl.gov.nl.ca/app/publications/exam_prep_guide.pdf

Plan of Training (POT)

A *Provincial Plan of Training* details the full scope of learning for a particular occupation, including both technical training competencies and industry experiences necessary to write an IP Red Seal exam (and complete the requirements for Red Seal Certification), or to write a provincial examination. The Plan of Training is based on the NOA.

POT Website: <https://www.aesl.gov.nl.ca/app/plans.html>

Red Seal Website

Red Seal is a program that sets common standards to evaluate the skills of tradespeople across Canada. It is a partnership between the Federal Government and the provinces/territories.

The Red Seal model has been based on the National Occupational Analyses (NOA) which supports the development of multiple-choice examinations. A new Red Seal Occupational Standard (RSOS) was introduced in 2015 and is taking the place of the NOA.

Red Seal Website: <http://www.red-seal.ca/>

Industrial Electrician PRACTICE Exam

This is **NOT** an IP exam. This is a practice exam provided by the Inter-provincial Standards Red Seal program. It was developed using similar question types to that of a Red Seal exam. The exam is intended to be used for self-assessment in preparation for writing an IP Exam.

Sample questions can be found at:

<http://www.red-seal.ca/s.1mpl.2.2x.1mQ.5.2st.3.4ns-eng.html?tid=123>

Glossary of Terms

The Red Seal website also lists a Glossary of Terms which will be helpful in preparing for your IP exam:

http://www.red-seal.ca/trades/industrialelectric/2016rs.4s_.1ppc_gl.4ss.1ry-eng.html

Acronyms

The Red Seal website also lists Acronyms which will be helpful in preparing for your IP exam:

http://www.red-seal.ca/trades/industrialelectric/2016rs.4s_.1pp.1_.1cr.4nym-eng.html

List of Tools and Equipment

The Red Seal website also shows a list of Tools and Equipment which will be helpful in preparing for your IP exam:

http://www.red-seal.ca/trades/industrialelectric/2016rs.4s_.1ppb_t.4.4ls-eng.html

Resources – Book List

The books listed below can help you obtain information on specific topics. It is not necessary to use these books specifically, as you may find others that will be equally beneficial.

If you wish to obtain any of the resources listed above, here is the reference information:

- Canadian Electrical Code*, Canadian Standards Association, 2009, ISBN 1553246926
- Delmar's Standard Textbook of Electricity*, 4th Edition, Herman, Stephen L. ISBN 1418065803
- Electrical Motors Controls for Integrated Systems*, 3rd Edition, Rockis, Gary J. Mazur. Glen A, ISBN 0826912079
- Electrical Motors Controls for Integrated Systems (workbook)*, 3rd Edition, ISBN 0826912084
- Electrical Wiring Commercial*, 5th Canadian Edition, Filice, Maltese, Marchetti, Mullin, Millerand Miller, ISBN 0176502165
- Electrical Wiring Industrial*, 3rd Canadian Edition, Branch, Granelli, Herman, Miller, Smith, and Stephenson, ISBN 0176502149
- Electrical Wiring Residential*, 5th Edition, Branch, Miller, Mullin, Stephenson, Todd, and Trineer, ISBN 0176502157
- Industrial Motor Control*, 5th Edition, Herman, Stephen L, ISBN 1401838022
- IPT's Crane and Rigging Handbook*, 4th Edition, Garby, Roland G, ISBN 0920855016
- IPT's Electrical Handbook*, 4TH Edition, Putz, Herb, ISBN 0920855229
- IPT's Safety First Handbook*, 3rd Edition, Basaraba, Bruce M, ISBN 02920855342

Disclaimer

Various external resources (websites, textbooks) have been listed in this study guide to assist an individual in preparing to write an IP Red Seal Exam. This does not mean the Department of Advanced Education, Skills and Labour, Newfoundland and Labrador endorses the material or that these are recommended as the best resources. There may be other resources of equal or greater value to an individual preparing for an IP Red Seal exam. The Department of Advanced Education, Skills and Labour has no control over the content of external textbooks and websites listed, and no responsibility is assumed for the accuracy of the material.

Conclusion

We hope this guide has provided you with some useful tools as you prepare for your IP Red Seal exam. If you have any questions regarding your IP Red Seal exam please contact your regional office (*see Appendix A for a list of regional offices*).

We appreciate your comments and feedback regarding the usefulness of this study guide. If you have any comments or suggestions, we welcome your feedback. The feedback form at the end of this guide can be used for this purpose.

Appendix A: Regional Offices

If you have any questions regarding your IP Red Seal exam, please contact one of the following regional offices:

Department of Advanced Education, Skills and Labour
Apprenticeship and Trades Certification Division
Toll Free: 1-877-771-3737
<https://www.aesl.gov.nl.ca/app/>

Corner Brook
1-3 Union Street Aylward Building, 2 nd Floor Corner Brook, NL A2H 5M7
Telephone: (709) 637-2366 Facsimile: (709) 637-2519

Grand Falls-Windsor
42 Hardy Avenue Grand Falls-Windsor, NL A2A 2J9
Telephone: (709) 292-4215 Facsimile: (709) 292-4502

Clarenville
45 Tilley's Road Clarenville, NL A5A 1Z4
Telephone: (709) 466-3982 Facsimile: (709) 466-3987

St. John's
P.O. Box 8700 1170 Topsail Road Mount Pearl, NL A1B 4J6
Telephone: (709) 729-2729 Facsimile: (709) 729-5878

Happy Valley – Goose Bay
163 Hamilton River Road Burse Building Happy Valley – Goose Bay, NL A0P 1E0
Telephone: (709) 896-6348 Facsimile: (709) 896-3733

Appendix B: Calculator Use

The picture below shows a calculator with the same functions as the one you will be provided with during your exam. It is advisable to borrow or purchase one with similar functions so that you can familiarize yourself with it before you write your exam.



Appendix C: Answer Sheet Example

With your exam you will be given an answer sheet similar to the one below. When answering multiple choice questions be sure to fill the circle completely and fill the circle that corresponds to the question on the exam.

Dual readhead scanner required to score this sheet

KEY ID
 A B C D

SCORING & PRINTING OPTIONS:
 RESCORE MULTIPLE ANSWER SCORING
 This sheet always uses the "Total Only" scoring option.

1 (A B C D E) 26 (A B C D E) 51 (A B C D E) 76 (A B C D E)
 2 (A B C D E) 27 (A B C D E) 52 (A B C D E) 77 (A B C D E)
 3 (A B C D E) 28 (A B C D E) 53 (A B C D E) 78 (A B C D E)
 4 (A B C D E) 29 (A B C D E) 54 (A B C D E) 79 (A B C D E)
 5 (A B C D E) 30 (A B C D E) 55 (A B C D E) 80 (A B C D E)
 6 (A B C D E) 31 (A B C D E) 56 (A B C D E) 81 (A B C D E)
 7 (A B C D E) 32 (A B C D E) 57 (A B C D E) 82 (A B C D E)
 8 (A B C D E) 33 (A B C D E) 58 (A B C D E) 83 (A B C D E)
 9 (A B C D E) 34 (A B C D E) 59 (A B C D E) 84 (A B C D E)
 10 (A B C D E) 35 (A B C D E) 60 (A B C D E) 85 (A B C D E)
 11 (A B C D E) 36 (A B C D E) 61 (A B C D E) 86 (A B C D E)
 12 (A B C D E) 37 (A B C D E) 62 (A B C D E) 87 (A B C D E)
 13 (A B C D E) 38 (A B C D E) 63 (A B C D E) 88 (A B C D E)
 14 (A B C D E) 39 (A B C D E) 64 (A B C D E) 89 (A B C D E)
 15 (A B C D E) 40 (A B C D E) 65 (A B C D E) 90 (A B C D E)
 16 (A B C D E) 41 (A B C D E) 66 (A B C D E) 91 (A B C D E)
 17 (A B C D E) 42 (A B C D E) 67 (A B C D E) 92 (A B C D E)
 18 (A B C D E) 43 (A B C D E) 68 (A B C D E) 93 (A B C D E)
 19 (A B C D E) 44 (A B C D E) 69 (A B C D E) 94 (A B C D E)
 20 (A B C D E) 45 (A B C D E) 70 (A B C D E) 95 (A B C D E)
 21 (A B C D E) 46 (A B C D E) 71 (A B C D E) 96 (A B C D E)
 22 (A B C D E) 47 (A B C D E) 72 (A B C D E) 97 (A B C D E)
 23 (A B C D E) 48 (A B C D E) 73 (A B C D E) 98 (A B C D E)
 24 (A B C D E) 49 (A B C D E) 74 (A B C D E) 99 (A B C D E)
 25 (A B C D E) 50 (A B C D E) 75 (A B C D E) 100 (A B C D E)

ANSWER KEY INFO.

# OF KEYS	ITEM COUNT
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

PERFORMANCE ASSESSMENT

ROSTER #	% OF TOTAL SCORE		POINTS EARNED	
	0%	100%	0	1
1	0	1	0	1
2	1	1	1	1
3	2	2	2	2
4	3	3	3	3
5	4	4	4	4
6	5	5	5	5
7	6	6	6	6
8	7	7	7	7
9	8	8	8	8
0	9	9	9	9

Bar Code

NUMBER CORRECT

PERCENT CORRECT

ROSTER NUMBER

SCORE

RESCORE

COMBINED POINTS EARNED

COMBINED PERCENT CORRECT

LETTER GRADE

SCORE

RESCORE

200 ITEM

MARKING INSTRUCTIONS

Use a No. 2 Pencil

A ● C D E

Fill oval completely

A B C D E

Erase cleanly

STUDENT ID NUMBER

0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

NAME _____

SUBJECT _____

PERIOD _____ DATE _____

Feedback Form

Study Guide - Industrial Electrician

Please answer the following:

- (1) This Study Guide is a useful tool for exam preparation.
 strongly agree agree disagree strongly disagree
- (2) The topics contained in the guide are arranged in a logical order.
 strongly agree agree disagree strongly disagree
- (3) The design and format of the guide caught my attention.
 strongly agree agree disagree strongly disagree
- (4) The instructions throughout the guide are clear and to the point.
 strongly agree agree disagree strongly disagree
- (5) The resources listed in this guide are suitable and valuable.
 strongly agree agree disagree strongly disagree
- (6) The guide should contain more information.
 strongly agree agree disagree strongly disagree

Suggested information/resources to include:

Additional Comments:

Please complete this form and return via fax or mail to the following:

Department of Advanced Education, Skills and Labour
Apprenticeship and Trades Certification Division
Standards and Curriculum Unit
45 Tilley's Road, Clarenville, NL A5A 1Z4
Fax: (709) 466-3987

