

# Apprenticeship and Certification Study Guide



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# Introduction

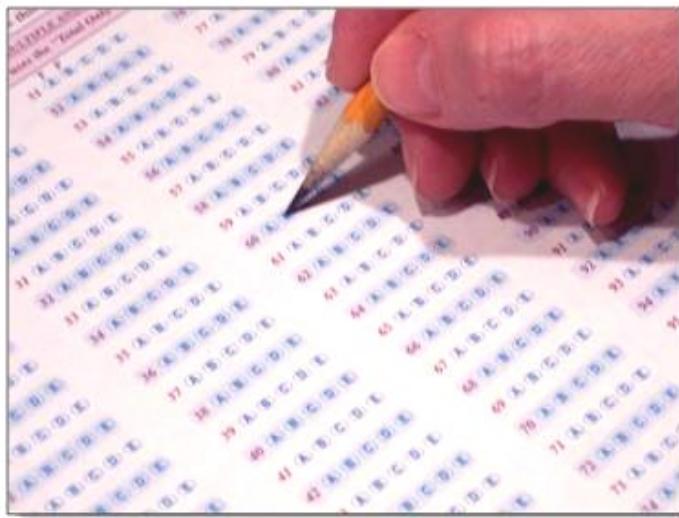
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This Study Guide has been developed by the Newfoundland and Labrador Department of Education and Early Childhood Development, Apprenticeship and Trades Certification Division, to assist apprentices and trade qualifiers as they prepare to write the Red Seal exam. Red Seal exams are available for all Red Seal trades. For a list of Red Seal trades please refer to the Department of Education and Early Childhood Development website: <https://www.gov.nl.ca/atcd/designated-trades/list-of-designated-trades/>

**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

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## Before the Exam

You must contact the nearest Apprenticeship and Trades Certification Divisional office to make request to write the 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

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All 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).

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.

On the following pages, examples of each of the three types of questions are provided.

### Level 1 Examples:

1. Which procedure is to be completed before removing a bayonet fuse from a transformer?
  - A. Pressure relief valve needs to be pulled.
  - B. Secondary cables need to be disconnected.
  - C. Voltage check needs to be performed.
  - D. Transformer oil needs to be drained.



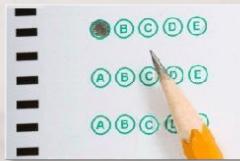
2. After isolation and before working on an underground primary cable, how is a capacitive charge dissipated?

- A. Employ a fast acting disconnect.
- B. Apply protective grounding.
- C. Coat conductors with an anti-oxidant.
- D. Make use of protective rubber matting.



3. Where is a link stick connected when changing a dead-end unit on an energized line?

- A. In series between the hoist and sling.
- B. In parallel with a nylon hoist.
- C. Between the hoist and grip.
- D. Between the cross arm and sling.



## Level 2 Examples:

1. What is to be done during a tension stringing operation when the level wind will not move fully to the right or left?

- A. Stop the pull and secure the pulling line.
- B. Stop the pull and release tension from the pulling line.
- C. Disengage the level wind and continue with pull.
- D. Place the level wind in the center position and continue with pull.



2. What is considered when changing-out dampers on a transmission line?

- A. Conductor weight, operating voltage and insulator rating.
- B. Conductor sag, operating voltage and line current.
- C. Conductor weight, structure height and hot stick capability.
- D. Conductor weight, line current and hot stick capacity.



3. Which information is required when installing a fused disconnect switch?

- A. kVA rating of the line, kVA load and feeder fault current.
- B. kV rating of the line, line current and feeder fault current.
- C. kV rating of the line and the load, and feeder fault current.
- D. kV rating of the line, kVA load and continuous current flow.



### Level 3 Examples:

1. An energy meter has a kW h factor of 7.2 and the disc rotates 40 times in  $\frac{1}{2}$  minutes. What is the load being indicated by this meter?

- A. 4147.2 watt.
- B. 6912 watt.
- C. 6912 volts-amp.
- D. 7200 watt.



2. What is the compressive force on the dead-end pole ( $T \times H/L$ ) if the height of the pole is 10 m, the tension is 570 kg and the guy is placed 14 m from the pole?

- A. 40.71.
- B. 79.8.
- C. 407.14.
- D. 798.



3. What is the kVA on a 120/208 V transformer bank when the wye connected load is 145,165 and 150 A line current?

- A. 31.89 kVA.
- B. 53.98 kVA.
- C. 55.20 kVA.
- D. 95.50 kVA.



**Source of Questions:**

[www.red-seal.ca/s.1mpl.2.2x.1mQ.5.2st.3.4ns-eng.html?tid=194](http://www.red-seal.ca/s.1mpl.2.2x.1mQ.5.2st.3.4ns-eng.html?tid=194)

## Exam Content

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### 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.

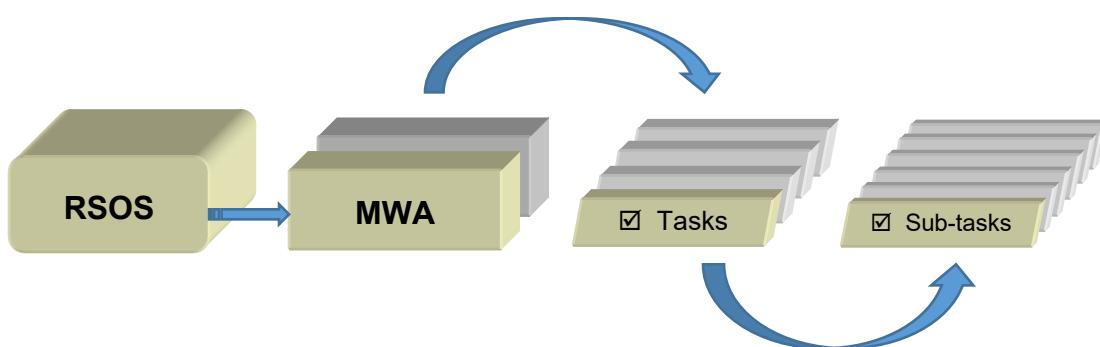
The RSOS was introduced in 2015 and is now taking the place of the NOA. Each RSOS or NOA sets the standard for a Red Seal trade. The Red Seal examination is based on the Red Seal Standard.

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*).

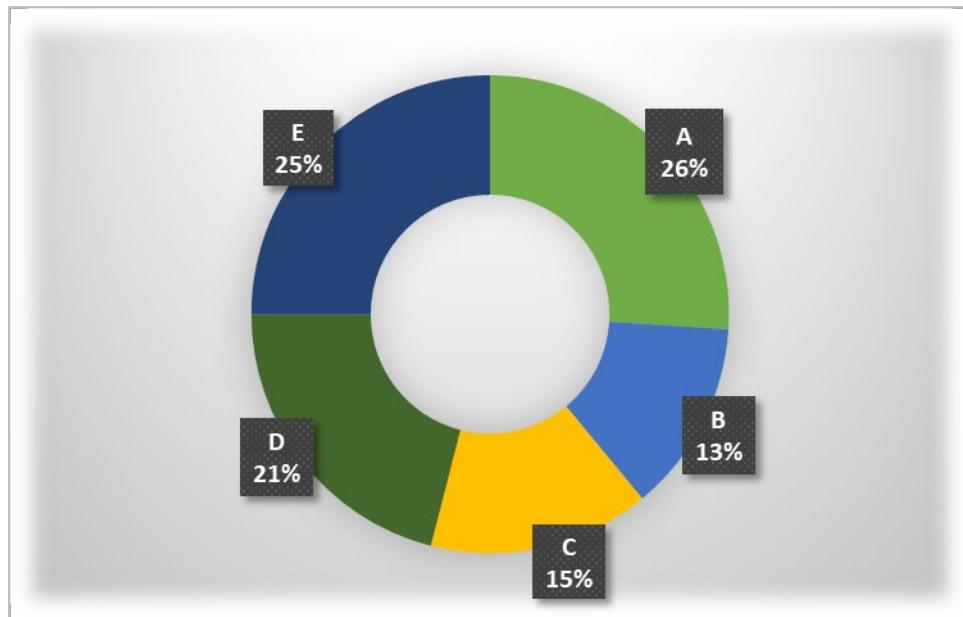


The NOA will continue to be used as the occupational standard for trades that do not yet have an RSOS developed.

## 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, 26% of the questions on the **Powerline Technician** Exam will be based on **MWA A**.

**Powerline Technician**



MWA TITLES			
MWA A	Performs Common Occupational Skills	MWA D	Installs Auxiliary Equipment
MWA B	Installs Structures	MWA E	Performs Operation, Maintenance and Repair
MWA C	Installs Conductor Systems		

## Exam Breakdown

The **Powerline Technician** Red Seal Exam has 125 questions. The following table shows a breakdown of the approximate number of questions that come from each RSOS MWA. It is important to note that the 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
<b>MWA A</b>	<b>Performs Common Occupational Skills</b>	<b>32</b>
<b>Task 1</b>	Performs safety related functions	
<b>Task 2</b>	Uses and maintains tools and equipment	
<b>Task 3</b>	Organizes work	
<b>Task 4</b>	Accesses work area	
<b>Task 5</b>	Uses live-line methods	
<b>Task 6</b>	Uses communication and mentoring techniques	
<b>MWA B</b>	<b>Installs Structures</b>	<b>16</b>
<b>Task 7</b>	Installs pole structures	
<b>Task 8</b>	Installs steel lattice structures	
<b>MWA C</b>	<b>Installs Conductor Systems</b>	<b>19</b>
<b>Task 9</b>	Installs overhead conductors and cables	
<b>Task 10</b>	Installs underground and underwater cable	
<b>MWA D</b>	<b>Installs Auxiliary Equipment</b>	<b>26</b>
<b>Task 11</b>	Installs lighting systems	
<b>Task 12</b>	Installs voltage control equipment	
<b>Task 13</b>	Installs protection equipment	
<b>Task 14</b>	Installs metering equipment	
<b>Task 15</b>	Installs communication devices	
<b>MWA E</b>	<b>Performs Operation, Maintenance and Repair</b>	<b>32</b>
<b>Task 16</b>	Operates distribution and transmission systems	
<b>Task 17</b>	Maintains distribution and transmission systems	
<b>Task 18</b>	Repairs distribution systems	
<b>Task 19</b>	Repairs transmission systems	
	<b>Total</b>	<b>125</b>

## RSOS Sub-tasks

The following *RSOS Task Profile Checklist* outlines the MWAs, tasks and sub-tasks for your trade. The 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 check mark (✓) 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 for your trade.

**Task Profile Checklist**  
**Based on 2019 RSOS**  
**Powerline Technician**

**MWA A: Performs Common Occupational Skills**

<input type="checkbox"/> <b>Task 1: Performs safety related functions</b>
<b>Sub-Tasks</b>
<input type="checkbox"/> Uses personal protective equipment (PPE) and safety equipment <input type="checkbox"/> Controls powerline hazards <input type="checkbox"/> Controls environmental hazards <input type="checkbox"/> Performs lock-out and tag-out procedures <input type="checkbox"/> Performs temporary grounding and bonding procedures
<input type="checkbox"/> <b>Task 2: Uses and maintains tools and equipment</b>
<b>Sub-Tasks</b>
<input type="checkbox"/> Uses hand, power and powder-actuated tools and equipment <input type="checkbox"/> Uses electrical measuring and testing equipment <input type="checkbox"/> Uses rigging, hoisting and lifting equipment
<input type="checkbox"/> <b>Task 3: Organizes Work</b>
<b>Sub-Tasks</b>
<input type="checkbox"/> Interprets plans, drawings and specifications <input type="checkbox"/> Prepares worksite <input type="checkbox"/> Plans job tasks and procedures
<input type="checkbox"/> <b>Task 4: Accesses work area</b>
<b>Sub-Tasks</b>
<input type="checkbox"/> Climbs poles and steel lattice structures <input type="checkbox"/> Uses access equipment <input type="checkbox"/> Uses on and off road equipment
<input type="checkbox"/> <b>Task 5: Uses live-line methods</b>
<b>Sub-Tasks</b>
<input type="checkbox"/> Uses cover up <input type="checkbox"/> Uses rubber gloves <input type="checkbox"/> Uses bare-hand methods ( <b>NOT COMMON CORE</b> ) <input type="checkbox"/> Uses fiberglass reinforced plastic (FRP) tools (hot sticks)
<input type="checkbox"/> <b>Task 6: Uses communication and mentoring techniques</b>
<b>Sub-Tasks</b>
<input type="checkbox"/> Uses communication techniques <input type="checkbox"/> Uses mentoring techniques

## MWA B: Installs Structures

### Task 7: Installs pole structures

**Sub-Tasks**

- Frames pole structures
- Sets pole structures
- Installs pole structure guys and anchors

### Task 8: Installs steel lattice structures

**Sub-Tasks**

- Assembles steel lattice structures
- Erects steel lattice structures
- Installs steel lattice structure guy wires and anchors

## MWA C: Installs Conductor Systems

### Task 9: Installs overhead conductors and cables

**Sub-Tasks**

- Strings overhead conductors and cables
- Sags overhead conductors and cables
- Ties-in overhead conductors and cables
- Installs splices and connections to overhead conductors and cables

### Task 10: Installs underground and underwater cable

**Sub-Tasks**

- Installs conduit and cable
- Places direct buried cable
- Splices underground and underwater cable
- Terminates underground and underwater cable

## MWA D: Installs Auxiliary Equipment

### Task 11: Installs lighting systems

#### Sub-Tasks

- Installs street lights
- Maintains street lights

### Task 12: Installs voltage control equipment

#### Sub-Tasks

- Installs transformers
- Installs capacitors
- Installs voltage regulators
- Installs switches
- Installs reactors **(NOT COMMON CORE)**

### Task 13: Installs protection equipment

#### Sub-Tasks

- Installs reclosers
- Installs sectionalizers
- Installs fuses
- Installs lightning arrestors

### Task 14: Installs metering equipment

#### Sub-Tasks

- Installs primary metering equipment
- Installs secondary metering equipment

### Task 15: Installs communication devices

#### Sub-Tasks

- Installs cellular antennas
- Transfers communication lines

## MWA E: Performs Operation, Maintenance and Repair

### Task 16: Operates distribution and transmission systems

**Sub-Tasks**

- Operates transmission systems
- Operates distribution systems
- Performs station switching

### Task 17: Maintains distribution and transmission systems

**Sub-Tasks**

- Inspects distribution and transmission systems
- Maintains pole structures
- Maintains steel lattice structures
- Maintains system components
- Trims trees

### Task 18: Repairs distribution systems

**Sub-Tasks**

- Troubleshoots overhead distribution systems
- Troubleshoots underground and underwater distribution systems
- Repairs overhead distribution systems
- Repairs underground and underwater distribution systems

### Task 19: Repairs transmission systems

**Sub-Tasks**

- Troubleshoots overhead transmission systems
- Troubleshoots underground and underwater transmission systems
- Repairs overhead transmission systems
- Repairs underground and underwater transmission systems

## Create a Study Plan

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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: \_\_\_\_\_**

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

**Study Time Table for Week of: \_\_\_\_\_**

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

# 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 journeyperson 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.

<https://www.gov.nl.ca/atcd/files/Study-Strategies-and-Exam-Prep-Guide-November-2025.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 RSOS.

<https://www.gov.nl.ca/atcd/designated-trades/pots-aacs/>

## 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 2019 and is taking the place of the NOA.

<https://www.red-seal.ca/>

## Powerline Technician 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.

<https://www.red-seal.ca/eng/s.1mpl.2.2x.1mQ.5.2st.3.4ns.shtml?tid=194>

## Red Seal Exam Self-Assessment Guide

Use this self-assessment tool to rate your own understanding and experience with the tasks of the trade that are on the Red Seal examination:

[https://www.red-seal.ca/\\_conf/assets/custom/docms/powerline-tech/self-assessment.pdf](https://www.red-seal.ca/_conf/assets/custom/docms/powerline-tech/self-assessment.pdf)

## Acronyms

This Red Seal website shows a list of Acronyms which can be helpful in preparing for your Red Seal exam!

<https://red-seal.ca/eng/trades/powerlinetech/app-a.shtml>

## Tools and Equipment

The Red Seal website lists Tools and Equipment which will be helpful in preparing for your Red Seal exam:

<https://red-seal.ca/eng/trades/powerlinetech/app-b.shtml>

## Glossary

The Red Seal website shows a list of terms which will be helpful in preparing for your Red Seal exam:

<https://red-seal.ca/eng/trades/powerlinetech/app-c.shtml>

## Resources – Book List

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You can use this list to 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:**

- Delmar's Standard Text of Electricity*, 4<sup>th</sup> edition, Delmar Publishers, 2008, Herman, S., ISBN 978-1418065805
- The Guide Book for Lineman's and Cableman's Handbook*, McGraw-Hill, Mack, J., and Shoemaker, T.M., ISBN 978-0071467896
- Practical Problems in Mathematics for Electricians*, 6<sup>th</sup> edition, Delmar Publishers, 2001, Herman, S., ISBN 978-0766838970
- The Field Guide for Powerline Workers*, 1<sup>st</sup> edition, Delmar Publishers, 2006, Soelen, W.V., ISBN 978-1418014872
- Electrical Essentials for Powerline Workers*, 2<sup>nd</sup> edition, Delmar Publishers, 2004, Soelen, W.V., ISBN 978-1401883584
- Distribution Transformer Handbook*, 4<sup>th</sup> edition, Alexander Publications, Item #774
- Hot Stick Manual*, A.B. Chance Company, Product Code #100, UPC #09635906801, [www.hubbellcatalog.com/hps/datasheet.asp?PN=100&FAM=hot\\_line\\_tools](http://www.hubbellcatalog.com/hps/datasheet.asp?PN=100&FAM=hot_line_tools)

## **Disclaimer**

Various external resources (websites, textbooks) have been listed in this study guide to assist an individual in preparing to write a Red Seal Exam. This does not mean the Department of Education and Early Childhood Development, 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 a Red Seal exam. The Department of Education and Early Childhood Development 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 Red Seal exam. If you have any questions regarding your 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

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

Department of Education and Early Childhood Development

Apprenticeship and Trades Certification Division

Toll Free: 1-877-771-3737

<https://www.gov.nl.ca/atcd/contact-us/staff-listing-and-office-locations/>

**Corner Brook**

1-3 Union Street  
Aylward Building, 2<sup>nd</sup> 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) 729-5688  
Facsimile: (709) 729-5878

**Happy Valley – Goose Bay**

163 Hamilton River Road  
Bursey Building  
Happy Valley – Goose Bay, NL  
A0P 1E0

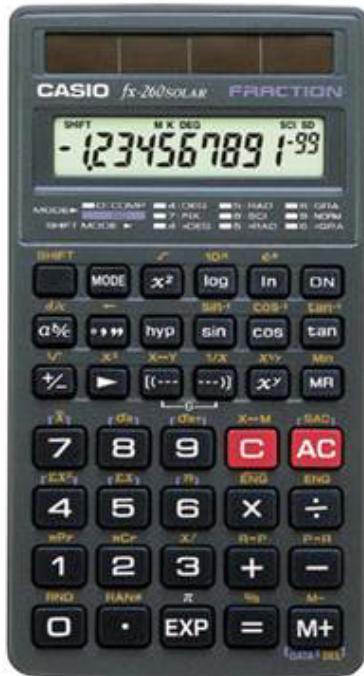
Telephone: (709) 896-6348  
Facsimile: (709) 896-3733

## Appendix B: Calculator Use

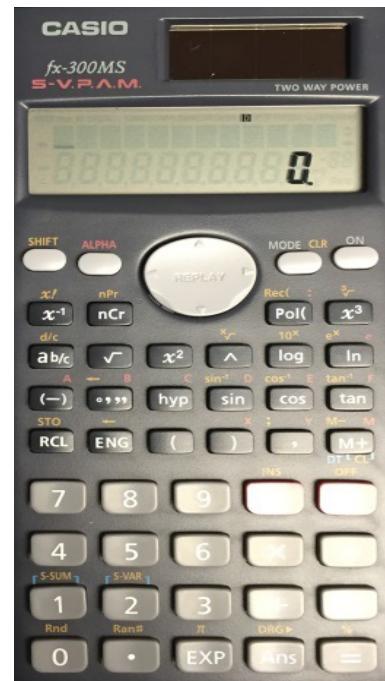
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The picture below shows a calculator with the same functions as the one you will be provided with during your exam. It is advisable to borrow or purchase one with similar functions so that you can familiarize yourself with it before you write your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

**Casio FX-260**



**Casio FX-300 MS**



## Appendix C: Answer Sheet Example

With your exam you will be given an answer sheet like 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.

<i>Dual readhead scanner ■ required ■■■ to score this sheet</i>																																																																																																								
		<input type="checkbox"/> <b>KEY ID</b> <b>(A B C D E)</b>	<input type="checkbox"/> <b>RESCORE</b> <input type="checkbox"/> <b>MULTIPLE ANSWER SCORING</b> <i>This sheet always uses the "Total Only" scoring option.</i>																																																																																																					
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## **Feedback Form**

### **Study Guide – Powerline Technician**

Please answer the following:

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- (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:

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Additional Comments:

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

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

Department of Education and Early Childhood Development  
Apprenticeship and Trades Certification Division

