Apprenticeship and Certification Study Guide

Welder

RSOS 2023

Newfoundland & Labrador

Table of Contents

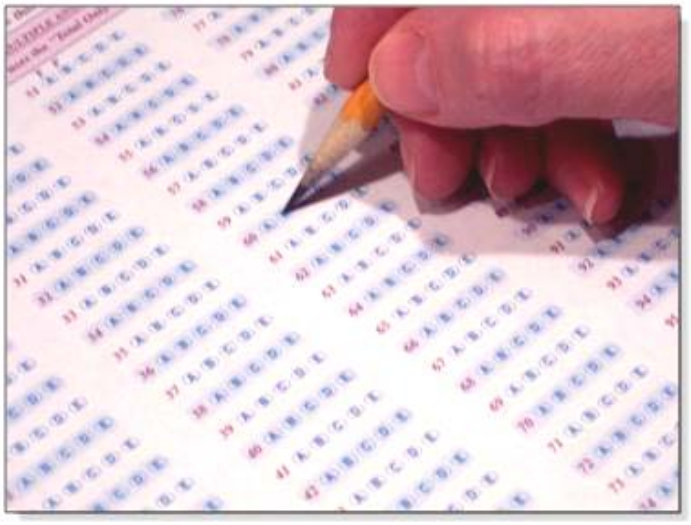
Introduction

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

Before the Exam

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

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.

Level 1 Examples:

1. What is used to determine the inter-pass temperature of a welded joint?

   A. Spit test.
   B. Spark test.
   C. Temp stick.
   D. Color of the metal.

2. What is the minimum temperature an electrode oven should normally be set?

METRIC	IMPERIAL
A. 24° C	A. 75° F
B. 49° C	B. 120° F
C. 121° C	C. 250° F
D. 316° C	D. 600° F

3. What unit is used to measure force or pressure in a welding circuit?

A. Volts.
B. Watts.
C. Amperes.
D. Ohms.

Level 2 Examples:

1. When using the air carbon arc cutting (AAC) process, what must be done to eliminate the excessive slag adhering to the edges of the cut?

A. Change polarity.
B. Change electrode angle.
C. Decrease travel speed.
D. Decrease electrode diameter.

2. Which standard refers to welded steel construction using metal arc welding?

   A. CSA Z662.
   B. CSA W178.2.
   C. CSA W59.
   D. CSA W47.1.

3. What is the purpose of a groove angle when welding thick plate?

   A. To increase weld reinforcement.
   B. To allow access to the root of the weld.
   C. To prevent burn-through at the root.
   D. To reduce welding time.

Level 3 Examples:

1. A cylindrical tank with a 12 foot (365.75 cm) O.D. is to have a nozzle installed at 45 degrees around the circumference. From the 0° reference point what would be the linear measurement to locate the nozzle? (*Answer to the nearest 16th (0.15 cm) of an inch) Imperial Metric*?

   A. 4’-1/8”. 122.237 cm
   B. 4’-8 9/16”. 143.667 cm
   C. 6’-9 7/16”. 206.849 cm
   D. 14’-1 10/16”. 430.847 cm

2. What is the most common cause of undercut on the cap pass of a 3F weld?

A. Travel speed too slow.
B. Amperage too high.
C. Wire stick out too long.
D. Contact tip to work distance is excessive.

3. What is the cause of root suck back?

A. Arc length too long and excessive pre-heat.
B. Arc length too short and incorrect fit-up.
C. Improper position of filler metal addition, current too low and travel speed too fast.
D. Improper position of filler metal addition, current too high and travel speed too low.

Source of questions:

https://www.red-seal.ca/eng/s.1mpl.2.2x.1mQ.5.2st.3.4ns.shtml?tid=250

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.

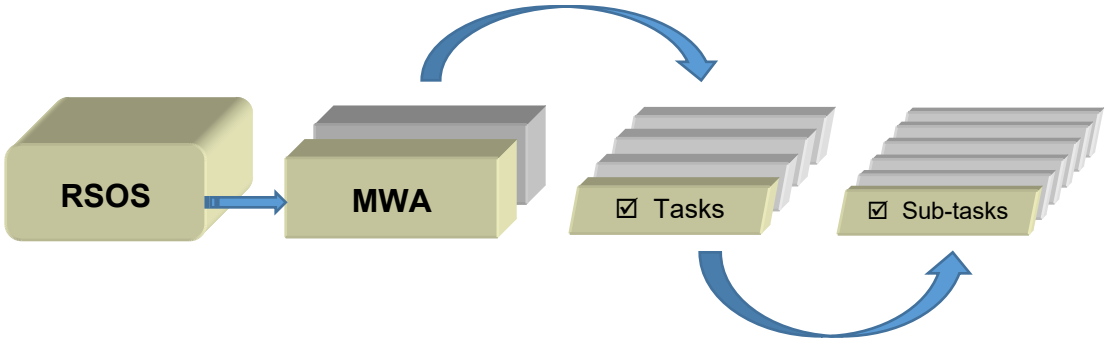
The RSOS was introduced in 2015 and is now taking the place of the NOA. Each RSOS or NOA sets the standard for a Red Seal trade. The Red Seal examination is based on the Red Seal Standard.

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

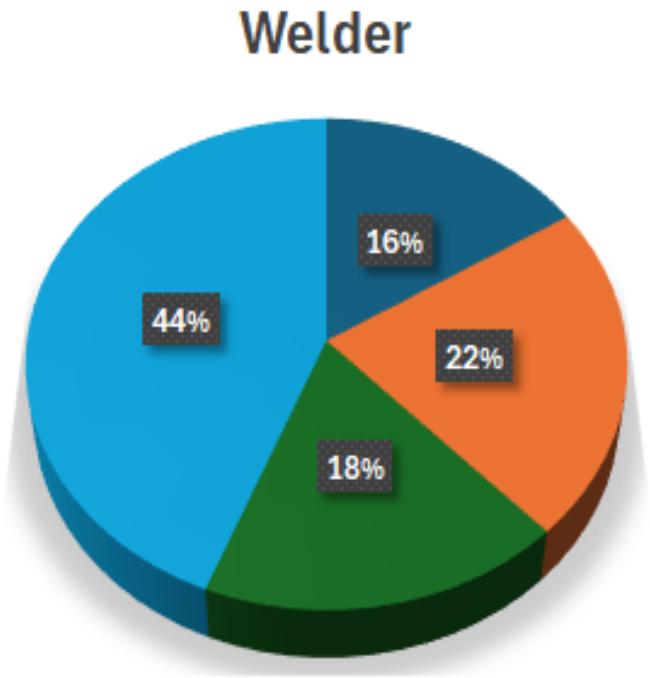
RSOS material is organized into the following categories: **MWA (***Major Working Activity***)**. The MWAs are further broken down into **TASKS** (*describes activities within an MWA*) and **SUB-TASKS (***describe activities within a task – This is what the exam is based on***)**.



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, 22% of the questions on the **Welder** Exam will be based on **B.**



MWA TITLES			
MWA A	Performs Common Occupational Skills	**MWA C**	Performs Cutting and Gouging
MWA B	Performs Layout and Fabrication of Components for Welding	**MWA D**	Performs Welding Processes

Exam Breakdown

The **Welder** exam currently has 125 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	**PerformsCommon Occupational Skills**	**20**
Task 1	Maintains tools and equipment	
Task 2	Uses access and material handling equipment	
Task 3	Performs safety-related activities	
Task 4	Organizes work	
Task 5	Performs routine trade activities	
Task 6	Uses communication and mentoring techniques	
MWA B	**Performs Layout and Fabrication of Components for Welding**	**28**
Task 7	Performs layout	
Task 8	Fabricates components	
MWA C	**Performs Cutting and Gouging**	**23**
Task 9	Uses tools and equipment for non-thermal cutting and grinding	
Task 10	Uses oxy-fuel gas cutting (OFC) process for cutting and gouging	
Task 11	Uses plasma arc cutting (PAC) process for cutting and gouging	
Task 12	Uses air carbon arc cutting (CAC-A) process for cutting and gouging	
MWA D	**Performs Welding Processes**	**54**
Task 13	Welds using shielded metal arc welding (SMAW) process	
Task 13	Welds using flux cored arc welding (FCAW), metal cored arc welding (MCAW) and gas metal arc welding (GMAW) processes	
Task 14	Welds using gas tungsten arc welding (GTAW) process	
Task 15	Welds using submerged arc welding (SAW) process	
	Total	**125**

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 RSOS 2023
Welder

MWA A: Performs Common Occupational Skills

☐ **Task 1: Maintains tools and equipment**

Sub-Tasks

- ☐ Maintains hand, power, layout and measuring tools
- ☐ Maintains stationary machinery
- ☐ Maintains thermal cutting equipment
- ☐ Maintains welding equipment

☐ **Task 2: Uses access and material handling equipment**

Sub-Tasks

- ☐ Uses access equipment
- ☐ Uses rigging, hoisting and lifting equipment

☐ **Task 3: Performs safety-related activities**

Sub-Tasks

- ☐ Performs hazard assessments
- ☐ Maintains safe work environment
- ☐ Uses personal protective equipment (PPE) and safety equipment

☐ **Task 4: Organizes work**

Sub-Tasks

- ☐ Uses documentation and reference material
- ☐ Plans job tasks
- ☐ Organizes materials

☐ **Task 5: Performs routine trade activities**

Sub-Tasks

- ☐ Performs quality inspection
- ☐ Marks welds, materials and parts
- ☐ Controls temperature of weldments
- ☐ Stores welding consumables
- ☐ Selects welding processes and power source
- ☐ Performs equipment start-up and shut-down
- ☐ Finishes final product

☐ **Task 6: Use Communication and Mentoring Techniques**

Sub-Tasks

- ☐ Uses Communicagtion Techniques
- ☐ Uses Mentoring Techniques

MWA B: Performs Layout and Fabrication of Components for Welding

☐ **Task 7: Performs layout**

Sub-Tasks

- ☐ Develops templates
- ☐ Transfers dimensions from drawings to materials

☐ **Task 8: Fabricates components**

Sub-Tasks

- ☐ Prepares materials
- ☐ Fits components for welding
- ☐ Assembles components

MWA C: Performs Cutting and Gouging

☐ **Task 9: Uses tools and equipment for non-thermal cutting and grinding**

Sub-Tasks

- ☐ Selects cutting and grinding tools
- ☐ Cuts using stationary power tools
- ☐ Cuts using shears and ironworkers
- ☐ Cuts using hand tools
- ☐ Cuts using portable power tools

☐ **Task 10: Uses oxy-fuel gas cutting (OFC) process for cutting and gouging**

Sub-Tasks

- ☐ Selects OFC gas and equipment
- ☐ Sets up OFC equipment
- ☐ Sets operating parameters for OFC equipment
- ☐ Performs cut and gouge using OFC equipment

☐ **Task 11: Uses plasma arc cutting (PAC) process for cutting and gouging**

Sub-Tasks

- ☐ Selects PAC equipment and consumables
- ☐ Sets up PAC equipment
- ☐ Sets operating parameters for PAC equipment
- ☐ Performs cut and gouge using PAC equipment

☐ **Task 12: Uses air carbon arc cutting (CAC-A) process for cutting and gouging**

Sub-Tasks

- ☐ Selects CAC-A equipment and consumables
- ☐ Sets up CAC-A equipment
- ☐ Sets operating parameters for CAC-A equipment
- ☐ Performs cut and gouge using CAC-A equipment

MWA D: Performs Welding Processes

☐ **Task 13: Welds using shielded metal arc welding (SMAW) process**

Sub-Tasks

- ☐ Selects SMAW equipment and consumables
- ☐ Sets up SMAW equipment
- ☐ Sets operating parameters for SMAW
- ☐ Performs weld using SMAW equipment

☐ **Task 14: Welds using flux cored arc welding (FCAW), metal cored arc welding (MCAW) and gas metal arc welding (GMAW) processes**

Sub-Tasks

- ☐ Selects FCAW, MCAW and GMAW gas, equipment and consumables
- ☐ Sets up FCAW, MCAW and GMAW equipment
- ☐ Sets operating parameters for FCAW, MCAW and GMAW
- ☐ Performs weld using FCAW, MCAW and GMAW equipment

☐ **Task 15: Welds using gas tungsten arc welding (GTAW) process**

Sub-Tasks

- ☐ Selects GTAW gas, equipment and consumables
- ☐ Sets up GTAW equipment
- ☐ Sets operating parameters for GTAW
- ☐ Performs weld using GTAW equipment

☐ **Task 16: Welds using submerged arc welding (SAW) process**

Sub-Tasks

- ☐ Selects SAW equipment and consumables.
- ☐ Sets up SAW equipment
- ☐ Sets operating parameters for SAW
- ☐ Performs weld using SAW equipment

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 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 a 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

National Occupational Analysis - The RSOS is a document used for Red Seal trades that describes the knowledge and abilities required by a fully competent trades-person working in that trade. The content for the Red Seal exam is based on the RSOS.

www.red-seal.ca

Welder PRACTICE Exam

This is **NOT** a Red Seal exam. This is a practice exam provided by the Red Seal Standards 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 a Red Seal Exam.

https://www.red-seal.ca/eng/s.1mpl.2.2x.1mQ.5.2st.3.4ns.shtml?tid=250

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/eng/resources/selfexamspace.shtml?tid=250

Tools and Equipment

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

https://www.red-seal.ca/eng/trades/weld/2014n.4.1_10_.1pp.1_t.4.4ls.shtml

Glossary

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

https://www.red-seal.ca/eng/trades/weld/2014n.4.1_11_.1ppb_gl.4ss.1ry.shtml

Acronyms

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

https://www.red-seal.ca/eng/trades/weld/2014n.4.1_12_.1ppc_.1cr.4nym.shtml

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.

- ☐ *Modern Welding, 10th edition,* Goodheart-Willcox Publishing, 2004, Bowditch, Althouse and Turnquist, ISBN 978-1-56637-987-8
- ☐ *Welding Print Reading, 5th edition,* Goodheart-Willcox Publishing, 2007, Polanin, W. and Walker J., ISBN 978-1-59070-642-8
- ☐ *Blueprint Reading for Welders, 7th edition*, Thomas Delmar Learning, 2005, Bennett A.E., and Siy, L.J., ISBN 978-1-4018-6723-2
- ☐ *Welding Skills, 4th edition,* American Technical Publishing, 2009, Miller, R.T. and Moniz, B.J., ISBN 0826929923
- ☐ *Welding Skills Workbook, 3rd edition,* American Technical Publishing, 2004, Gosse, J., ISBN 0826930115
- ☐ *IPT's Metal Trades Handbook, 8th edition,* IPT Publishing and Training Ltd., 1993, Ashton, B.J., and Garby, R.G., ISBN 0-920855-32-X

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

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, 2nd 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

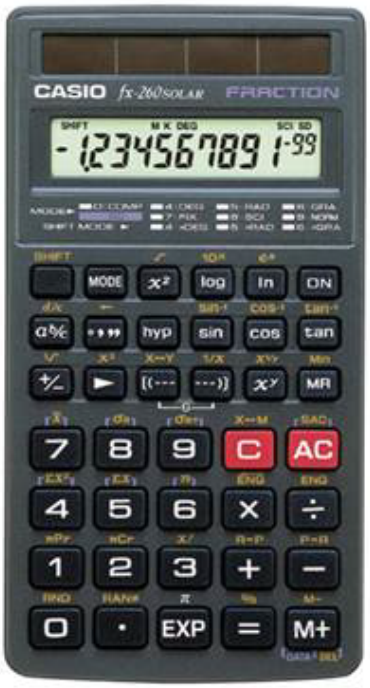
163 Hamilton River Road
Bursey Building
Happy Valley – Goose Bay, NL
A0P 1E0

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

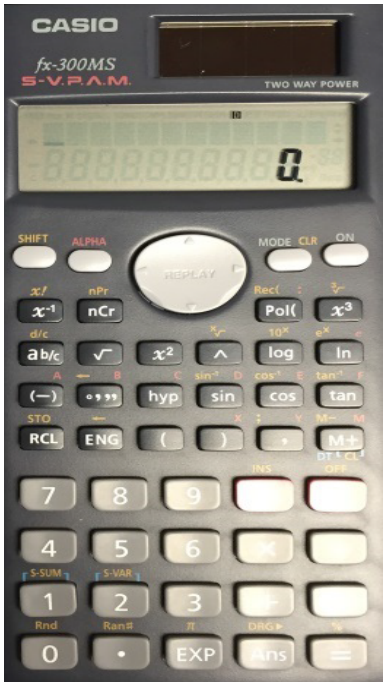
Appendix B: Calculator Use

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.

Casio FX-260

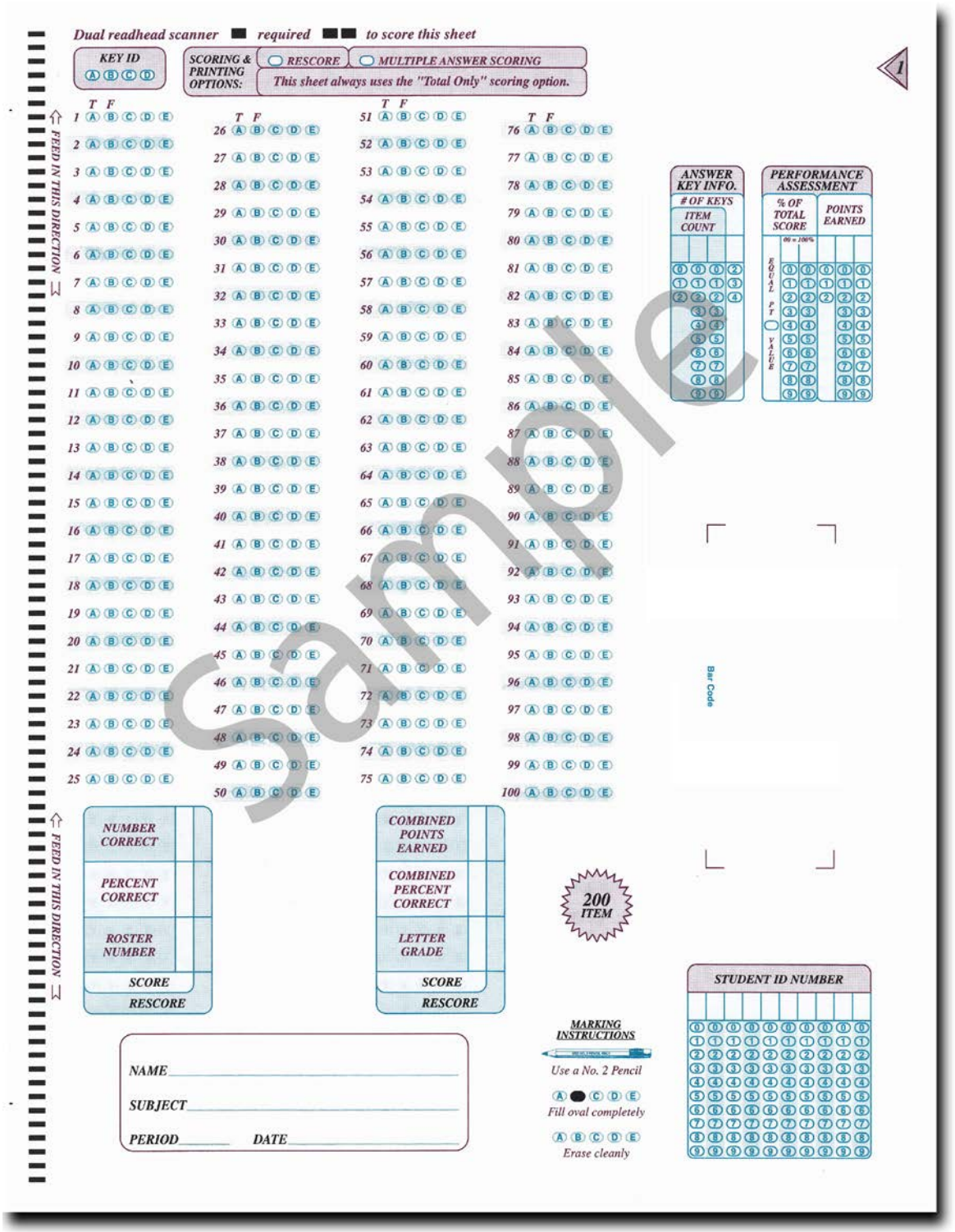


Casio FX-300 MS



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.



Feedback Form
Study Guide - Welder

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 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

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