CONTEST DESCRIPTION

Electronics

SECONDARY

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1 THE SKILLS FOR SUCCESS FOR CAREERS IN THE SKILLED TRADES AND TECHNOLOGY

In response to the evolving labour market and changing skill needs, the Government of Canada has launched the new Skills for Success *(former Essential Skills)* model defining nine key skills needed by Canadians to participate in work, in education and training, and in modern society more broadly. SCC is currently working with Employment and Social Development Canada (ESDC) to bring awareness of the importance of these skills that are absolutely crucial for success in Trade and Technology careers. Part of this ongoing initiative requires the integration and identification of the Skills for Success in contest descriptions, projects, and project documents. The next phase and very important aspect of our Skills for Success (SfS) initiative is to provide a *Skills Report Card* to each competitor at the Skills Canada National Competition. The purpose of the report card is to inform the competitor about their current level of nine identified Skills for Success based on their competition scores. With this knowledge, the competitor will be made aware which skill may require improvement. Full implementation is expected in the next Skills Canada National Competition.

The following 9 skills have been identified and validated as key skills for success for the workplace in the legend below:

[1]Numeracy, [2]Communication, [3]Collaboration, [4]Adaptability, [5]Reading, [6]Writing, [7]Problem Solving, [8]Creativity and Innovation, [9]Digital

These Skills for Success have been identified in section 2.4 and/or 3.2 of your Contest Description and if applicable, in your Project and supporting documents.

2 CONTEST INTRODUCTION

2.1 Description of the associated work role(s) or occupation(s)

https://www.skillscompetencescanada.com/en/skill_area/electronics/

2.2 Purpose of the Challenge

To evaluate each competitor's skills and recognize outstanding students for excellence and professionalism in the field of Electronics Technology.

Competitors will demonstrate their skills in Electronics Technology as it pertains to Measurement, Printed Circuit Board Assembly, Fault Finding, Printer Circuit Board Rework, Circuit Analysis and Bread Board Techniques.

2.3 Duration of contest

10 hours

Due to unforeseeable COVID-19 regulations/uncertainties, competition documents are subject to change.

2.4 Skills and Knowledge to be tested.

The contest will cover the theoretical and practical aspects of current state of the art electronic industry standards. The competitor <u>may</u> be asked to demonstrate abilities in the following areas:

- Interpret electronic schematic diagrams, pictorials, manufacturers technical specifications and suppliers' catalogues.[5]
- Identify common electrical and electronic components. [7]
- Construct, analyze and troubleshoot DC circuits including series resistance, parallel resistance, series-parallel resistance and solid-state switching circuits.[7]
- Construct, analyze and troubleshoot AC circuits including capacitive, inductive and complex RLC circuits[7].
- Construct, analyze and troubleshoot analog circuits including diodes, transistor amplifiers, IC amplifiers, operational amplifiers and comparator circuits. [7]
- Construct, analyze and troubleshoot [7] digital circuits including TTL/CMOS gates, timers and optical devices[9].
- Apply the appropriate test procedures and equipment to a given situation[7]
- Interpret the observed values from the test equipment. (AC/DC voltages, currents and waveforms and circuit resistance)[1]
- Identify basic systems of analog to digital and digital to analog conversion[1]
- Answer questions related to basic electrical/electronic theory[5,7]

3   CONTEST DESCRIPTION

3.1   List of documents produced and timeline for when competitors have access to the documents on the Skills/Compétences Canada website

DOCUMENT	DATE OF DISTRIBUTION
Project	December 2022
Declaration of Major Components	February 2023

3.2   Tasks that may be performed during the contest

- Hand - solder through-hole on a printed circuit board to acceptable industry standards.
- Hand – de solder through-hole on a printed circuit board.
- Assemble a circuit from a kit of parts PCB[7]
- Assemble a circuit from a kit of components on a breadboard.[7]
- Set-up and demonstrate use of common electronic measuring equipment including multimeters, power supplies, frequency generators and oscilloscopes.[1]

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- Troubleshoot simple electronic circuits having a preinstalled fault and restore to working condition.[7]
- Complete circuit analysis on a simple electronic circuit which may include generating a schematic diagram.[9]

Skills for Success - [1]Numeracy,[5]Reading, [7]Problem Solving, [9]Digital,

4 EQUIPMENT, MATERIAL, CLOTHING

4.1 Equipment and material provided by Skills/Compétences Canada

- Circuit Board and Breadboard kits

4.2 Equipment and material provided by the competitor

- Fluke Scopemeter c/w accessories (minimum 40MHz)
- Fluke Digital Multimeter c/w test leads and temperature probe
- Triple Power Supply fixed 5V@.5amp,0 to +/- 15 Volts @ 1 Amp minimum c/w leads and clips
- Waveform Generator c/w BNC to alligator cables
- Solder will be supplied. No Lead Sn99.3/Cu0.7.
- Project wire
- Solder Iron suitable for use with no-lead solder types. Stand, Tip cleaner, tips of choice. Butane solder devices will not be allowed.
- De-Solder braid
- Three sets of test leads i.e. banana to alligator, banana to banana and alligator to alligator.
- Hand vacuum solder extractor
- Long nose pliers
- Side Cutters
- Wire Stripper
- Screwdrivers (including precision set)
- "Third Hand" including magnifying glass. (optional)
- Magnifier
- Power bar, 4 or more outlet (3'/1m or more cord length and must be CSA approved
- Pens, Pencils, Eraser, Ruler
- 2 breadboards, minimum size each, 2"x 6" (wire will be supplied)
- Desk Lamp
- Stand-alone calculator (non-programmable i.e., TI-30Xa)

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4.2.1 Toolboxes Guidelines

One of the objectives of SCC is the sustainability of the Competition. As a result, the toolboxes brought by Competitors will be restricted to the following maximum specifications.

The Competitor toolbox must not exceed 0.128 meters^3 in volume. It can be multiple toolboxes, but the total of all toolboxes must not exceed the maximum volume indicated. There is no exception to this rule. If the Competitor toolbox is larger than what is indicated, the Competitor with the guidance of the NTC, will need to remove items from the toolbox and those items will not be used during the competition. All tools must fit inside one or more toolboxes. Tools outside of a toolbox will not be permitted.

4.3 Required clothing provided by the competitor

- Competitors are to be dressed in a clean and safe manner (long pants and closed toe shoes)
- No jewelry on hands or wrists.

5 HEALTH AND SAFETY

5.1 Safety program

SCC has implemented a comprehensive safety program as health and safety is an integral part of our competitions. Our safety program includes guidelines and procedures to make the work environment in each skill area safer.

5.1.1 Safety manual

As part of our program a safety manual has been created to monitor and document health and safety within each skill area. It includes a definite plan of action designed to prevent accidents. The safety manual will be provided for every skill and these instructions must be followed and respected by all participants and officials at the SCNC.

5.1.2 Safety workshop

During orientation, Competitors will participate in a Safety workshop and they will be expected to work and maintain a safe working area during the competition. Any Competitor breaking any health, safety, and environmental rules, may be required to undertake a second safety workshop, this will not affect the Competitor's competition time.

5.2 COVID-19 Protocol

The COVID-19 guidelines will be shared as soon as they are available.
The COVID-19 guidelines will be subject to change based on the COVID-19 guidelines in place at the time of the competition.

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5.3 List of required personal protective equipment (PPE) provided by the <u>competitor</u>

- Safety Glasses with side shields

Note: Competitors who do not have the required protective equipment will not be allowed to participate in the competition.

6   ASSESSMENT

6.1 Point breakdown

Note: This list is subject to change.

TASKS	/100
Measurement Technique	15
Assembly and Testing	30
Circuit Analysis	10
Bread boarding Technique	20
Theory and Fault-Finding Technique	15
Rework	10

7   CONTEST SPECIFIC RULES

Contest specific rules cannot contradict or take priority over the Competition Rules. They do provide specific details and clarity in areas that may vary from contest to contest. Any additional contest rules will be reviewed during the competitor orientation.

TOPIC/TASK	CONTEST SPECIFIC RULE
Safety	• Competitors must wear their safety glasses with side shields or goggles when soldering, de-soldering and circuit assembly. Failure to comply with this regulation may result in disqualification from the competition at the discretion of the National Technical Committee (NTC) members on site.
Use of technology - music	• Competitors are allowed to listen to music through headphones or earbuds but must be provided by a non-cellular network. The sessions where music is allowed will be determined by the NTC.
Tools/ Infrastructure	• Competitors are responsible to supply the afore mentioned tools and supplies. Failure to bring the required tools and supplies may result in competitor not being allowed to participate.

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8 ADDITIONAL INFORMATION

8.1 Interpreter

If a competitor requires the help of an interpreter during the competition, the Skills/Compétences Canada Provincial/Territorial offices must advise Skills/Compétences Canada National Secretariat a minimum of 1 month prior to the competition or this service may not be guaranteed.

8.2 Ties

- Tiebreaker #1: In the event of a tie, the competitor with the highest score in the Bread boarding project will be declared the winner.
- Tiebreaker #2: If a tie still exists the competitor with the highest mark in the Assembly and Testing project will be declare the winner.
- Tiebreaker #3: If a tie still exists the competitor with the highest mark in the Theory and Fault-Finding project will be declared the winner.

8.3 Competition rules

Refer to the competition rules of the Skills Canada National Competition which can be found on our website.

9 NATIONAL TECHNICAL COMMITTEE MEMBERS

MEMBER ORGANIZATION	NAME
Newfoundland and Labrador	Kelly Spencer – Co-Chair
Ontario	Paul Cianflone – Chair
Manitoba	Ken Nemez
Saskatchewan	Shaun Nanan
British Columbia	Adam Drake

Contact the Skills/Compétences Canada national secretariat for any questions or concerns: Nathalie Maisonneuve (nathaliem@skillscanada.com).

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