ELECTRONICS TECHNOLOGY NYS

PURPOSE

To evaluate each contestant's preparation for employment and to recognize outstanding students for excellence and professionalism in the field of electronics technology.

ELIGIBILITY

Open to active SkillsUSA members enrolled in programs with industrial electronics or electronics technology as the occupational objective.

CLOTHING REQUIREMENT

Men: Black dress slacks; white dress shirt; plain black tie with no pattern or a SkillsUSA black tie. Black socks and black shoes.

Women: Official attire minus red blazer, windbreaker-style jacket or sweater. Black dress slacks or skirt, with businesslike white, collarless blouse or white blouse with small, plain collar that may not extend onto the lapels of the blazer; black sheer or skin-tone hose and black shoes

All: Safety glasses with side shields or goggles. (Prescription glasses can be used only if they are equipped with side shields. If not, they must be covered with goggles.)

Note: **Contestants must wear their contest clothing to the contest orientation meeting.**

EQUIPMENT AND MATERIALS

1. Supplied by the NY chair/ committee:
   a. All materials, supplies and job information needed to construct and test the designed circuit
   b. The Technical Committee will not supply tools, test equipment or calculators.
2. Supplied by the contestant:
   a. Small needle nose pliers
   b. Wire cutter (Flush cutters)
   c. Wire stripper for small gauge wire. For No. 28 and No. 30 gauge wire
   d. Small assorted screwdriver set (Phillips and slotted)
   e. 25-watt soldering iron and associated soldering supplies (Note: No soldering guns allowed)
   f. 25-watt soldering iron and associated soldering supplies (Note: No soldering guns allowed)
   g. Other hand tools as desired, subject to the approval of the technical committee
   h. Digital Multimeter capable of measuring ohms, volts, and current.
   i. 20 or more MHz dual trace Oscilloscope
   j. two 10x probes.
   k. Calculator (can have Engineering notation and 1/X functions, but **cannot** be programmable)
   l. DC power supply – (variable if possible) capable of 12 VDC
   m. Signal generator for audio range frequencies. (Not RF ranges)
   n. Minimum of 4 mini clips to mini clip cables (mini Alligator clip leads)
   o. Test leads for the above pieces of equipment
   p. All competitors must create a one-page résumé and submit a hard copy to the technical committee chair at orientation. Failure to do so will result in a 10-point penalty.

***Note*: Your contest may also require a hard copy of your résumé as part of the actual contest. Check the Contest Guidelines and/or the updates page on the NYS SkillsUSA Web site:** http://www.nysskillsusa.org/

SCOPE OF THE CONTEST

The contest will assess the ability to apply theoretical and practical knowledge of "state of the art" electronic industry standards as determined by the Electronics Technicians – International

Additionally, the contest also requires contestant proficiency of competencies listed by the National Coalition for Electronics Education — Basic Electronics. Contestants will demonstrate their ability to perform jobs or skills from the following list of competencies as determined by the SkillsUSA. Which includes Nida Corp., ETA-I and CertTEC,
Changes may occur as needs or standards are updated. Any modifications and or changes will be posted to the SkillsUSA NY website.

Knowledge Performance

The contest includes two written knowledge tests, a certified electronics technician exam and a customer service test.
The electronics exam is an industry-standard Electronics Technician Association – International written test. The customer service test is Electronics Technician Association International Customer Service Specialist (CSS) exam.
This may change as needs or standards are updated. If there is a need to change or revise the exam, the change will be posted on the SkillsUSA NY website.

Skill Performance

The skill performance portion of the contest will include circuit construction, soldering and circuit/system trouble shooting. Contestants will read and follow instructions, interpret circuit design drawings, analyze and identify circuit faults, solder various electronic components and properly use electronic components in accordance with their design specifications.

Contest Guidelines

1. Contestants will be provided with the characteristics, parameters and information to accomplish the assigned tasks.
2. Time limit:
    a. Contestants will begin upon a signal from the timekeeper.
    b. As soon as contestants have completed the assignment and are fully satisfied with the operation and quality of their work, they will signal the judge and stop their work. This signal will determine elapsed time and speed.
3. The completed projects will be tested by the judges for quality of work and operating specifications.

Standards and Competencies

ET 1.0 — Interpret, record and report technical data from provided materials to related ISCET standards

1.1 Draw and interpret electronic schematics
1.2 Record data and design curves and graphs
1.3 Write reports
1.4 Maintain test logs
1.5 Make equipment failure reports
1.6 Specify and requisition simple electronic components
1.7 Compose technical letters
1.8 Write formal reports of laboratory experiences

ET 2.0 — Apply knowledge of DC circuits to a given scenario using related competencies of NCEE-Basic Electronics and ISCET-CET

2.1 Solve basic algebraic problems as applicable to electronics
2.2 Relate electricity to nature of matter
2.3 Identify sources of electricity
24 Define voltage, current, resistance, power and energy
2.5 Apply and relate Ohms Law
2.6 Read and interpret color codes to identify resistors
2.7 Measure properties of a circuit using VOM and DVM meters
2.8 Compute and measure conductance and resistance of conductors and insulators
2.9 Analyze, construct and troubleshoot series circuits, parallel circuits, series-parallel circuits and voltage dividers
2.10 Solve network theorem problems using Kirchhoff, Thevenin, Norton, Superposition and Delta-Wye
2.11 Analyze, construct and troubleshoot maximum power transfer theory
2.12 Define magnetic properties of circuits and devices

2.13 Determine physical and electrical characteristics of capacitors and inductors
2.14 Analyze and measure RL and RC time constants
2.15 Set up and operate a VOM, DVM, power supplies and oscilloscopes for DC circuits

ET 3.0 — Apply knowledge of AC circuits to a given scenario using related competencies of NCEE-Basic Electronics and ISCET-CET

3.1 Solve basic trigonometric problems as applicable to electronics (prerequisite to AC)
3.2 Identify properties of an AC signal
3.3 Identify AC sources
3.4 Analyze and measure AC signals using oscilloscope, frequency meters and generators
3.5 Analyze, construct and troubleshoot AC capacitive circuits, AC inductive circuits, RLC circuits (Series, Parallel, Complex) series and parallel resonant circuits, filter circuits and polyphase circuits
3.6 Analyze basic motor theory and operation
3.7 Analyze basic generator theory and operation
3.8 Set up and operate VOM, DVM and power supplies for AC circuits
3.9 Set up and operate oscilloscopes, frequency counters, signal generators, capacitor-inductor analyzers and impedance bridges for AC circuits
3.10 Analyze and apply principles of transformers to AC circuits

ET 4.0 — Apply knowledge of solid-state devices to a given scenario using related competencies of NCEE-Basic Electronics and ISCET-CET

4.1 Identify properties of semiconductor materials
4.2 Analyze and measure characteristics of P-N junction diodes
4.3 Analyze and measure characteristics of special diodes
4.4 Analyze, construct and troubleshoot diode circuits
4.5 Identify, define and measure characteristics of bipolar transistors, thyristors and integrated circuits
4.6 Set up and operate VOM, DVM and power supplies for solid state devices
4.7 Set up and operate oscilloscopes, frequency counters, signal generators, for solid state devices

ET 5.0 — Apply knowledge of analog circuits to a given scenario using related competencies of NCEE-Basic Electronics and ISCET-CET

5.1 Analyze, construct and troubleshoot single-stage amplifiers, multi-state amplifiers, basic power supplies and filters, power supply regulators, active filters, and oscillators
5.2 Analyze motor or phase control circuits
5.3 Set up and operate VOM, DVM and power supplies for analog circuits
5.4 Set up and operate oscilloscopes, frequency counters, and signal generators for analog circuits
5.5 Set up and operate impedance bridges for analog circuits
5.6 Set up and operate recorders for analog circuits

ET 6.0 — Apply knowledge of digital devices to a given scenario using related competencies of NCEE-Basic Electronics and ISCET-CET

6.1 Define and apply number systems to codes and arithmetic
6.2 Analyze, construct and troubleshoot logic gates, logic arithmetic circuits, flip-flops, and encoders and decoders
6.3 Identify, define and measure characteristics of IC logic families
6.4 Analyze, construct and troubleshoot registers and counters, clock and timing circuits, multiplexers and demultiplexes, digital to analog, and analog to digital, 555 timer circuits
6.5 Analyze, construct and troubleshoot displays and representative digital systems
6.6 Set up and operate VOM, DVM and logic probes for digital devices
6.7 Set up and operate power supplies, pulsers, oscilloscopes, logic analyzers, signature analyzers, pulse generators, and counters for digital devices

ET 7.0 — Apply knowledge of microprocessors to a given scenario using related competencies of NCEE-Basic Electronics and ISCET-CET

7.1 Analyze, construct and troubleshoot CPUs, BUS systems, memory systems and input/output ports, microprocessor applications and systems

7.2 Execute computer instruction sets

7.3 Analyze and troubleshoot microprocessor systems

7.4 Set up and operate VOM, DVM, power supplies, pulsers, oscilloscopes, logic/data analyzers, signature analyzers, pulse generators, and counters for micro processing

ET 8.0 — Use laboratory practices common to industry situation

8.1 Demonstrate proper OSHA-related safety standards

8.2 Make electrical connections

8.3 Identify and use hand and power tools used in electronics technology

8.4 Utilize standard troubleshooting procedures for defective circuits