

The Written (on-line) Examination

The six levels of Written Examinations are a part of the Craft Certification process. They explore increasingly more complex topics, in an effort to systematically evaluate each individual's level of competence. The following outline provides a detailed description of the topics covered in these proctored, on-line Written Examinations.

Level 1

100 Multiple Choice Questions – 3 Hours Maximum

Blueprints, Diagrams, and Drawings	Blueprint questions focus on symbol identification, schedule definitions and drawing types.
National Electrical Code	Code questions focus on definitions, Code Section identification, general knowledge about conductors and devices, NEC coverage, equipment installation requirements and general language used in the Code.
Raceways	Raceway questions focus on conduit installation terminology, raceway components, conduit bending or fabrication procedures and conduit fabrication equipment.
Safety	Safety questions focus on the proper use of tools, safe maintenance procedures, and equipment, jobsite safety and tools or procedures which are used to prevent electrical shock.
Electrical Theory	Theory questions cover basic circuits, Ohm's Law, theory of operation for basic components, calculating power in a circuit, basic terminology, conductor properties, basic circuit measurements and test procedures and circuit installation.
Math	Questions which use math focus on conduit fabrication and basic circuit calculations.
Materials	Material identification questions focus on raceway components.
Tools	Tool identification questions focus on pocket tools and tools used for raceway installation.
Terminating	Terminating questions focus on installation of devices and branch wiring.
Support	Support questions focus on jobsite procedures and application and types of knots, hitches and splices.

Level 2

100 Multiple Choice Questions – 3 Hours Maximum

Blueprints, Diagrams and Drawings	Blueprint questions focus on symbol identification, schedule, drawing types and document interpretation procedures.
Codes and Standards	Code questions focus on definitions, circuit ratings and on installation, rating procedures and installation layout requirements for materials and branch circuits.
Installing Raceways	Raceway questions focus on various types of conduit and their installation, mounting and tools used to fabricate offsets and bends.
Electrical Theory	Theory questions cover basic circuit calculations, inductors, capacitors, Ohm's Law, calculations for power, reactance and impedance and theory relating to AC Circuits.
Tools	Tool questions focus on tools used in the fabrication of conduit, test equipment and the use of power tools.

Level 3

100 Multiple Choice Questions – 3 Hours Maximum

Blueprints, Diagrams and Drawings	Blueprint questions focus on reading and identifying different types of drawings.
Codes and Standards	Code questions include the identification of various cable types and their characteristics, the design and layout of branch circuits, grounding and bonding and tap rule and load calculations.
Safety	Safety questions focus on working safely around electrical circuits.
Grounding	Grounding questions are focused on bonding and grounding systems for services, panels and equipment.
Transformers	Transformer questions cover various types and configurations of transformers, with questions on theory, markings, transformer protection and transformer calculations.
Electrical Theory	Electrical and Electronic theory questions include circuit analysis, signals and signal processing, power factor and resonance, advanced circuit formulas, and semiconductors.

Level 4

100 Multiple Choice Questions – 3 Hours Maximum

Codes and Standards	Code questions address a variety of topics including lighting, HVAC, and heating devices, cable trays, aluminum conductors, motors, motor control and drives and hazardous locations.
Building Management and	This topic includes basics of building control and logic, programmable controllers including different input and output

Control Systems	devices, logic, computer devices and memory, numbering systems, and variable frequency drives.
Motors and Motor Control	Motor and motor control topics include motors, magnetic control circuits including devices and classifications, overload protections, pilot devices, timers, logic, PLC programming, types of control, speed control systems and troubleshooting.
HVAC	Items under this topic include the refrigeration cycle including theory and typical components, and HVAC load calculations.
Grounding	Grounding questions include both the theory of grounding and troubleshooting grounding systems, as well as lighting protection systems.

Level 5

100 Multiple Choice Questions – 3 Hours Maximum

Diagrams and Drawings	Questions for this topic focus on drawings and symbols used for either fire alarm systems or process control systems.
Codes and Standards	Code questions address general code information pertaining to standard wiring methods such as area fill. Additional topics which are addressed include emergency systems, hazardous locations, services, and special equipment and circuits.
Building Management and Control Systems	Items addressed under this topic relate to control theory and include signals, signal types, sensors and devices, instrument piping, process design, network configurations, signal calculations and instrument errors.
Security and Fire Alarm Systems	This topic addresses equipment, theory and common practices for both fire alarm systems and security systems. In addition the topic of troubleshooting is covered.
Telephone and Data Systems	This topic covers both voice and data networks, and includes voice or telephone theory, voice or telephone installation methods and installation practices, data signal characteristics, data theory and voice and data standards.
Power Distribution Systems	Power Distribution System questions cover medium voltage cable splicing and address theory, termination methods testing and safety for splices and terminations.

Level 6

200 Multiple Choice Questions – 4 Hours Maximum

All Topics	The level 6 Examination includes all topics covered under the Level 1 through Level 5 Examinations.
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The Performance (Hands-On) Evaluation

Just like the written examination, the performance evaluation measures multiple factors, including Knowledge, Skill and Ability. For example, individuals must be knowledgeable about reading blueprints and specifications to be able to interpret what must be done. They must have skills to be able to complete the tasks which are required to make the systems functional, and they must have the ability to use their knowledge and skills properly complete each instruction in a safe, code compliant, professional manner.

The performance evaluation is a proctored evaluation. Individuals work alone in a defined space, using only the materials provided to complete several different tasks. Actual task identification is left to the individual to determine. They are allowed to review blueprints and specifications prior to the evaluation, and to make decisions as to how they want to proceed to complete the tasks they identify. The proctor is not allowed to help in this process. Each individual completing the evaluation is on his or her own in determining what tasks they feel are necessary to complete the job at hand.

Performance Evaluation

Multiple Tasks – 4 Hours Maximum

Power Distribution	Individuals completing the performance evaluation must analyze the available power source(s) and determine how to utilize that power to complete different tasks.
Transformers	Transformers are a required part of both in the power distribution and the motor control tasks.
Motor Control	Motor control is a fundamental part of the evaluation, and is addressed through the installation of a motor and its associated controls.
Branch Lighting	Both incandescent and fluorescent lighting are addressed in the evaluation.
Branch	Standard duplex receptacles provide a test of the individual's ability

Receptacles	to properly install these circuits.
Grounding	All systems in the evaluation must be properly grounded, and the evaluation will determine if they meet all the NEC requirements.
Safety	Safety is an essential factor, and will be evaluated both from a performance perspective (work procedures) and from the perspective of the final product (completed systems).
Material Identification	Adequate materials are provided to complete all tasks, but the individual must identify what he/she needs and properly use that material to complete various system tasks.
Tools	All tools will be provided. However each individual is allowed to use his/her own pocket tools if desired. Individuals often prefer their won pocket tools over tools which they are not familiar with.