Closed Circuit Television

Study Guide

Assessments:

4020 CCTV Technician

4017 Manager

STATE OF OKLAHOMA
GREAT SEAL OF THE STATE OF OKLAHOMA
1907
DEPARTMENT OF LABOR

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Overview

This study guide is designed to help candidates prepare for licensure in alarm occupations in Oklahoma. It not only includes information about each of the examinations, but also the skills standards upon which the examinations are based, resources that can be used to prepare for the examinations and test taking strategies.

Each of the sections in this guide provides useful information for candidates preparing for the examinations.

- CCTV Licensure Examinations
  - Assessment Information
  - Standards and Test Content
  - Sample Questions
  - Test Writing Resources
  - Abbreviations, Symbols and Acronyms
- Strategies for Test Taking Success
- Notes

This assessments were developed in partnership with the Oklahoma Department of Labor, the state agency charged with regulating the Oklahoma alarm industry and licensing individuals and companies who sell, install, maintain, and monitor alarm, locksmith, and fire sprinkler equipment. Each examination measures the candidate's mastery of knowledge and skills expected of workers in the area of licensure he/she is seeking.

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CareerTech and Competency-Based Education: A Winning Combination

Competency-based education uses learning outcomes that emphasize both the application and creation of knowledge and the mastery of skills critical for success. In a competency-based education system, students advance upon mastery of competencies, which are measurable, transferable outcomes that empower students.

Career and technology education uses industry professionals and certification standards to identify the knowledge and skills needed to master an occupation. This input provides the foundation for development of curriculum, assessments and other instructional materials needed to prepare students for wealth-generating occupations and produce comprehensively trained, highly skilled employees demanded by the work force.

Tools for Success

CareerTech education relies on three basic instructional components to deliver competency-based instruction: skills standards, curriculum materials, and competency assessments.

Skills standards provide the foundation for competency-based instruction and outline the knowledge and skills that must be mastered in order to perform related jobs within an industry. Skills standards are aligned with national skills standards and/or industry certification requirements; therefore, a student trained to the skills standards is equally employable in local, state and national job markets.

Curriculum materials and textbooks contain information and activities that teach students the knowledge and skills outlined in the skills standards. In addition to complementing classroom instruction, curriculum resources include supplemental activities that enhance learning by providing opportunities to apply knowledge and demonstrate skills.

Certification Assessments test the student over material outlined in the skills standards and taught using the curriculum materials and textbooks. When used with classroom performance evaluations, certification assessments provide a means of measuring occupational readiness.

Each of these components satisfies a unique purpose in competency-based education and reinforces the knowledge and skills students need to gain employment and succeed on the job.

Measuring Success

Evaluation is an important component of competency-based education. Pre-training assessments measure the student's existing knowledge prior to receiving instruction and ensure the student's training builds upon this knowledge base. Formative assessments administered throughout the training process provide a means of continuously monitoring the student's progress towards mastery.

Certification assessments provide a means of evaluating the student's mastery of knowledge and skills. Coaching reports communicate assessment scores to students and provide a breakdown of assessment results by standard area. The coaching report also shows how well the student has mastered skills needed to perform major job functions and identifies areas of job responsibility that may require additional instruction and/or training.

Assessment Information

How are the assessments developed?

The assessments are developed by the CareerTech Testing Center in partnership with the Oklahoma Department of Labor. Items for the exams were developed and reviewed by committees of subject matter experts within each of the licensure areas. All subject matter experts are professionals who have many years of experience in the industry.

How do I register for an exam?

Candidates for licensure in the alarm, locksmith, or fire sprinkler industry must contact a testing center to register for an exam. A list of testing centers and their contact information can be found at www.okhcp.com under the Alarm/Locksmith tab. Candidates will be required to show one of the following forms of photo identification:

1. valid, current driver's license issued by any state in the United States, or
2. valid, current state of Oklahoma identification card

Identification cards issued by other states or entities **will not** be accepted.

What do the examinations cover?

Each examination is aligned to the skills standards for that licensure area. The standards for each licensure area are contained in this study guide.

What is the benefit of taking the exam?

The assessments provide a measure of mastery of knowledge and skills needed by employees entering the alarm industry. Candidates who score 70% or higher on the written examination and meet all licensure requirements will be issued a license by the Oklahoma Department of Labor.

Are the exams timed?

Yes. The test plan for each licensure area specifies the time allowed to complete the written examination. If the time allowed expires before the candidate is finished with the examination, the examination will automatically be submitted for scoring and all unanswered questions will be marked incorrect.

Can candidates use a calculator on the exam?

Yes, calculators may be used on these exams. If a calculator is needed, it will be provided by the testing center. Candidates will not be allowed to bring a calculator or electronic device with a calculator application into the testing area.

What is the testing fee for written examinations?

Candidates must pay all testing fees to the test site upon registration. The testing fee for the salesperson and manager exams is $45 per exam if taken at a HCP test site or $65 per exam if taken through the online proctor. The testing fee for the technician and fire sprinkler plan & design exam is $60 per exam if taken at a HCP test site or $85 per exam if taken through the online proctor.

Can candidates use code books or other resources during the examination?

All candidates may use a copy of the Oklahoma Alarm, Locksmith, and Fire Sprinkler Act. This resource will be provided by the test site and collected when the test is complete.

Candidates may bring and use publisher-bound code books as indicated in the charts below. **NOTE: Only publisher-bound books are allowed.** Candidates may not use photocopies that have been spiral bound, placed in a binder, etc. No loose pages of notes or codes are allowed. In addition, all references will be checked for handwritten notes specifically related to test questions. References that contain test-related notations will not be allowed.

The Oklahoma Department of Labor provides a link to a Business Folder that contains resources that Manager candidates may study while preparing for the exam. These documents are study resources only and **may not** be used during the test.

Licensure Area	Allowed Code Books				
	NFPA 70	NFPA 72	NFPA 99	NFPA 101	NFPA 731
CCTV Technician	✓	✓			✓
Manager	✓	✓		✓	✓

What can candidates expect on Test Day?

The assessment is web-based and delivered exclusively online by a proctor in the testing center. Once the exam window opens, the entire assessment is visible. Candidates can skip questions and return to them later. However, it is important to answer all questions before submitting the test for scoring — unanswered questions will be counted wrong.

When will I receive my results?

Candidates will receive their results immediately upon completion of the testing. These results must be included with the candidate's licensure application and sent to the Oklahoma Department of Labor.

Can candidates retake an exam?

Candidates who do not pass the written examination may retest. Although there is no formal waiting period for retesting, the ability to offer candidates an opportunity for same day retesting varies by test site — many test sites book testing seats several days or weeks in advance.

Standards and Test Content

4020 Closed Circuit Television (CCTV) Technician
70 Questions — Two hour time limit

A. Demonstrate Understanding of Codes, Standards and Regulations — 14% (10 questions)

1. Explain the purpose of standards and codes for electrical wiring
   - NEC
   - IBC
   - IRC
   - NFPA
2. List and explain standards within the NEC related to the CCTV industry
   - NEC 90
   - NEC 110
   - NEC 300-310.13
   - NEC 725
3. List and explain standards within the NFPA related to the CCTV industry
   - NFPA 72
5. Explain the purpose and role of the Occupational Safety and Health Administration
6. Demonstrate an understanding of rules promulgated by the Oklahoma Department of Labor to enforce the Oklahoma Alarm, Locksmith, and Fire Sprinkler Industry Act
7. Demonstrate basic knowledge of contract law as it pertains to the alarm industry

B. Demonstrate Knowledge of Basic Electronics and Electrical Components — 10% (7 questions)

1. Identify and describe the operation of electrical components and equipment
   - Resistors
   - Transformers
   - Batteries
   - Relays
   - Contacts
   - Splicing tools
   - Fuses, circuit breakers, surge protectors
   - Multimeter
2. Understand and apply Ohm's Law
3. Draw diagrams of normally-open, normally-closed, parallel and series circuit configurations
4. Explain how and why ground loops occur in electrical circuits
5. Explain precautions to take when handling equipment and electrical components (i.e. static electricity, moisture)

C. Demonstrate Knowledge of System Components and Configurations — 24% (17 questions)

1. Identify and describe the purpose of CCTV system components
   - Power supplies, power sources
   - Control relay devices
   - Cameras
   - Monitors
   - Recording devices

D. Layout a Basic CCTV System — 3% (2 questions)

1. Layout basic CCTV system devices and components
2. Incorporate basic inspection, testing and maintenance device requirements in a simple CCTV system layout

E. Practice Job Site Safety — 19% (13 questions)

1. Survey job site for unsafe work conditions and report appropriately
2. Identify and demonstrate the appropriate use of hand and power tools used to install, test, and service alarm systems
3. Identify and demonstrate the appropriate use of job site equipment
4. Practice safe ladder usage
5. Use proper fall techniques and practices
6. Use head, ear, eye and foot protection properly
7. Read and interpret Safety Data Sheets
8. Recognize injuries and health conditions commonly encountered at job sites
10. Identify precautions that should be taken when working in confined spaces and other potential hazardous environments

F. Demonstrate Knowledge of CCTV Systems and Installation Techniques — 24% (17 questions)

1. Use project plans and specifications to determine dimensions and installation requirements (i.e. type of materials, elevation and location of system components)
2. Demonstrate use of blueprints and adherence to specifications
3. Explain the types and applications of outlets, junction boxes, and conduit
4. Explain wire size standards and other considerations when making wire choices
5. Prepare and connect cable properly

6. Mount and fasten CCTV system components
7. Position and terminate cables, wires and strapping
8. Connect power and signaling wiring
9. Program and configure alarm systems
10. Assist with acceptance testing
11. Provide customer training

G. Maintain and Service CCTV Systems — 6% (4 questions)

1. Read, interpret and follow manufacturers' published instructions for CCTV system component operation and maintenance
2. Identify and locate all schematic components, connections and test points
3. Clean CCTV system components
4. Use test equipment to verify proper function of CCTV system components
5. Utilize software troubleshooting programs and other resources to resolve problems
6. Document all maintenance, repairs and security aspects correctly

Standards and Test Content

4017 Manager
55 Questions — 90 minute time limit

The Manager exam for alarm industry tests candidates over knowledge in the following areas:

Duty A: Demonstrate an Understanding of Codes, Standards and Regulations — 47% (26 questions)

Duty B: Understand Human Resources Issues Related to Managing Employees — 2% (1 question)

Duty C: Understand Insurance Issues Facing Managers — 4% (2 questions)

Duty D: Demonstrate Knowledge of Workplace Safety Requirements — 47% (26 questions)

Although some knowledge areas overlap with those found on the salesperson and technician exams, questions on the Manager assessment are directed toward the level of knowledge or understanding expected of those holding management positions in alarm, locksmith and fire sprinkler companies.

Sample Questions
Alarm, Locksmith, and Fire Sprinkler Industry Exams

1. AC stands for:

   a. altered current.
   b. accelerated current.
   c. alternating current.*
   d. active current.

2. What is the VDC in a circuit with 100Ω and 0.1A?

   a. 10V*
   b. 12V
   c. 15V
   d. 24V

3. An ionization detector detects fire in what stage?

   a. flame
   b. heat
   c. smoldering
   d. incipient*

4. Which jack is used to interface the digital communicator with the telephone line?

   a. RJ31X*
   b. RJ11B
   c. RJ14X
   d. RJ45K

5. Which factor increases the chance of shock or electrocution?

   a. high outdoor temperatures
   b. high humidity*
   c. insulated head protection
   d. dry cotton clothing

6. Acceptable audible notification appliances used in a security system include:

   a. self-contained sirens.*
   b. strobes.
   c. bed shakers.
   d. mass notification devices.

7. Which term refers to the speed at which data is transmitted?

   a. bandwidth
   b. payload
   c. bit rate
   d. baud rate*

8. Which central station system uses repeaters?

   a. police-connected
   b. long-range radio*
   c. line security
   d. McCulloh

9. According to NFPA 72, batteries may be used to maintain an access control system during a power failure provided that the doors unlock with how many minutes of loss of primary power to the alarm system?

   a. 4
   b. 5
   c. 10*
   d. 60

10. An electronic access control system is designed to:

    a. allow authorized individuals in while keeping unauthorized individuals out.*
    b. prevent unauthorized personnel from exiting an area.
    c. increase the number of occupants permitted inside the establishment.
    d. notify the authorities of intrusion by unauthorized individuals.

11. In a CCTV system, where are exit cameras generally located?

    a. in the manager's office pointed at the safe or recording device.
    b. near the doors pointed towards the interior of the building.*
    c. near the doors pointed towards the exterior of the building.
    d. outside the main entrance pointed towards the parking area.

12. Which problem indicates a ground loop?

    a. vertical bars in the picture
    b. ghosting
    c. power supply shorts
    d. rolling picture*

Abbreviations, Symbols and Acronyms on Alarm Industry Exams

When abbreviations, symbols or acronyms are more commonly used in written and verbal communication within the alarm industry than the words they represent, they will also be used on the written examination required for certification. The following is a list of the abbreviations, symbols, and acronyms used on the alarm industry examinations.

’	Foot/feet
”	Inch/inches
A	Amps/Amperes
AC	Alternating Current
Ah	Ampere-hours
AHJ	Authority Having Jurisdiction
AWG	American Wire Gauge
BNC	Bayonet Neill-Concelman
BOCA	Building Officials and Code Administrators International, Inc.
CCTV	Closed Circuit Television
CDMA	Code Division Multiple Access
CIF	Common Intermediate Format
dB	Decibel
DC	Direct Current
DTMF	Dual Tone Multi Frequency
DVR	Digital Video Recorder
EMI	Electromagnetic interference
EOL	End of line
EOLR	End of line resistor
FSK	Frequency Shift Keying
GPRS	Global Packet Radio Service
HVAC	Heating, Ventilation and Air Conditioning
GSM	Global System for Mobile
HD	High density
HPSA+	Evolved high-speed packet access
IBC	International Building Code
ICC	International Code Council
IP	Internet Protocol
IPv4	Internet Protocol Version 4
IR	Infrared
IRC	International Residential Code
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
kW	Kilowatts
KΩ	Kilo ohms or Kohms
mA	milliamps/milliamperes
MP	Mega Pixel
NAC	Network Access Control
NEC	National Electric Code
NFPA	National Fire Protection Association
NICET	National Institute for Credentialing in Engineering Technologies
NVR	Network Video Recorder
OSFM	Oklahoma State Fire Marshal
OSHA	Occuapational Safety and Health Administration
PIR	Passive infrared
PoE	Power over Ethernet
POTS	Plain Ole Telephone Service
PTZ	Pan-tilt-zoom
PVC	Polyvinyl Chloride
RCA	Radio Corporation of America
REX	Request to Exit
RF	Radio frequency
SIA	Security Industry Association
SMS	Short Message Service
THHN	Thermoplastic High Heat-resistant Nylon-coated
TNC	Threaded Neill-Concelman
UHF	Ultra High Frequency
UL	Underwriters Laboratory
UTP	Unshielded Twisted Pair
V	Volts
VA	Volt-amp
VAC	Watts, Alternative Current
VDC	Watts, Direct Current
VoIP	Voice over Internet Protocol
W	Watts
Ω	Ohms

Resources Used for Writing and Validating Test Items
Alarm Industry Exams

- National Fire Protection Association Codes – 70 (2008), 72 (2007), 99 (Nurse Call), 731 (2011)
- Oklahoma Burglar & Fire Alarm Association/NESA Training Materials – Level 1, CCTV
- NFPA 70 – Level I (Arkansas Security Alarm Association)
- International Building Code (2006) - 1008
- Underwriters Laboratory Standards – 681, 1069, 1981, 2560
- *Guide to Alarm Equipment* , False Alarm Reduction Association (FARA)
- National Electronic Security Alliance (NESA) Training Materials – Access Control
- Security Industry Alarm Coalition (SIAC)
- Fire Alarm Study Guide (NICET)
- OSHA.com (Occupational Safety and Health Administration)
- *Basics of Digital Multimeters,* Ideal Industries, Inc.
- *Webster's Medical Desk Dictionary*
- www.mayoclinic.org/first-aid
- www.webmd.com/first-aid

Testing Policies

Handling of Examination Materials

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Security/Cheating

If a candidate is caught cheating during the examination, testing will stop immediately. The candidate will receive a failing result and the incident will be reported to the Oklahoma Department of Labor for review. Testing fees will not be refunded and the candidate will not be able to test without a letter of approval from the ODOL. Each HCP Test Center reserves the right to monitor and record all testing using audio, visual, and electronic devices.

Testing Accommodations

Requests to accommodate special needs during testing (i.e. oral test administration, special seating arrangements) must be made at the time of registration by completing the HCP Form, Request for Testing Accommodations. Acceptable accommodations for Alarm, Locksmith, and Fire Sprinkler exams are determined by the ODOL.

Cancellations/Tardiness

Candidates who cancel a testing appointment at an HCP test center with at least 48 hours' notice may receive a refund of testing fees. Candidates who arrive more than one (1) hour late for an examination will not be permitted to test. Testing fees will not be refunded to candidates who are more than one (1) hour late or fail to give the required notice for cancellation.

Electronic Devices

Cellular phones, beepers, or other electronic devices are not permitted and must be turned off during testing. Use of electronic devices during testing will be considered cheating and will be handled accordingly.

Study Aides

Only allowed resources listed in this study guide are permitted in the testing area. Personal belongings brought into the testing area will be collected by testing personnel and returned when the examination has been completed. The HCP test center is not responsible for lost or misplaced items.

Translation

All examinations will be administered in English. Translators, translation devices, or translation dictionaries may not be used during the examination.

Eating/Drinking/Smoking

Candidates are not permitted to eat, drink, or smoke during the examination.

Misconduct

Candidates causing a disturbance of any kind or engaging in any kind of misconduct will be dismissed from the examination and reported to the Oklahoma Department of Labor for disciplinary measures.

Guest/Visitors

No guests, visitors, pets or children are allowed at the testing site.

Use of Restrooms

Candidates must obtain permission from the written test proctor to use the restroom during testing. All testing materials will be collected from the candidate. No additional testing time will be granted.

Test Taking Strategies

This section of the study guide contains valuable information for testing success and provides a common-sense approach for preparing for and performing well on any test.

General Testing Advice

1. Get a good night's rest the night before the test — eight hours of sleep is recommended.
2. Avoid junk food and "eat right" several days before the test.
3. Do not drink a lot or eat a large meal prior to testing.
4. Be confident in your knowledge and skills!
5. Relax and try to ignore distractions during the test.
6. Focus on the task at hand — taking the test and doing your best!
7. Listen carefully to the instructions provided by the exam proctor. If the instructions are not clear, ask for clarification.

Testing Tips

1. Read the entire question before attempting to answer it.
2. Try to answer the question before reading the choices. Then, read the choices to determine if one matches, or is similar, to your answer.
3. Do not change your answer unless you misread the question or are certain that your first answer is incorrect.
4. Answer questions you know first, so you can spend additional time on the more difficult questions.
5. Check to make sure you have answered every question before you submit the assessment for scoring — unanswered questions are marked incorrect.

NOTES