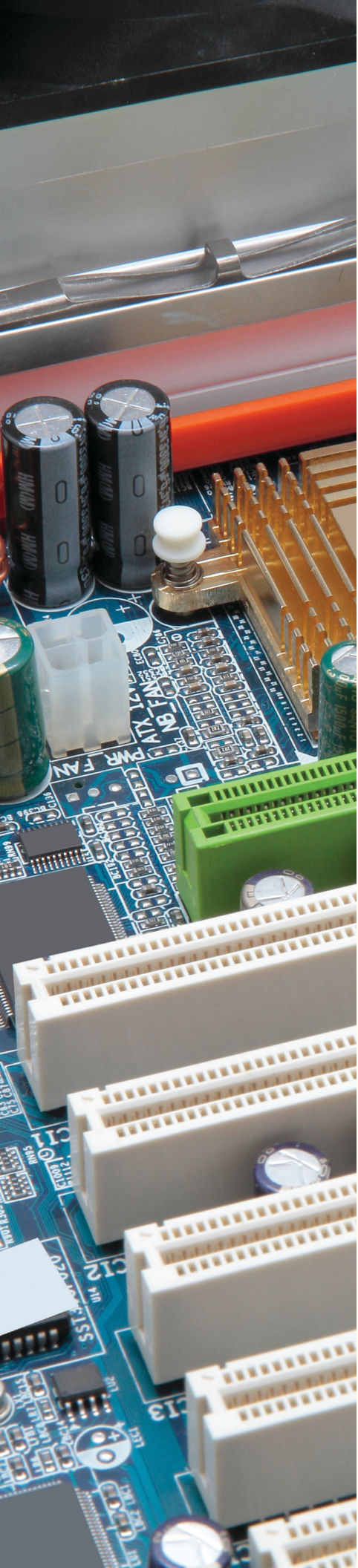




Computer Technology

Study Guide

Assessments:

1001 Computer Networking Technician

1401 Computer Repair Technician

Aligned with CompTIA's
A+ Hardware Service
Technician and Operating
Systems

career **tech** ✓
Testing
The Provider of Online Testing Solutions


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WORKS**

Overview

This study guide is designed to help students prepare for the Computer Networking Technician assessment and Computer Repair Technician assessment. It not only includes information about the assessments, but also the skills standards upon which the assessments are based, resources that can be used to prepare for the assessments, and test taking strategies. The assessments measure a student's ability to apply knowledge of the skills necessary for employment success in the computer technology field.

Each of the four sections in this guide provides useful information for students preparing for the Computer Technology assessments.

- CareerTech and Competency-Based Education: A Winning Combination
- Computer Technology Assessments
 - ▶ Assessment Information
 - ▶ Standards and Test Content
 - ▶ Sample Questions
 - ▶ Crosswalk to A+ Standards
 - ▶ Abbreviations, Symbols, and Acronyms
- Strategies for Test Taking Success
- Notes

These assessments and standards are aligned with those of CompTIA's A+ Hardware Service Technician and Operating Systems examination objectives.

For more information about these objectives, visit **www.comptia.org**.

Disclaimer

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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.

Computer Technology Assessment Information

What are the Computer Technology assessments?

The Computer Networking Technician and Computer Repair Technician assessments are end-of-program assessments for students in computer technology programs. The assessments provide an indication of student mastery of knowledge and concepts necessary for success in careers in this area.

How were the assessments developed?

The assessments were developed by the CareerTech Testing Center. Items were developed and reviewed by a committee of subject matter experts.

The committee assigned frequency and criticality ratings to each skill, which determines the significance of each task for test development:

Frequency: represents how often the task is performed on the job. Frequency rating scales vary for different occupations. The rating scale used in this publication is presented below:

1 = less than once a week 2 = at least once a week 3 = once or more a day

Criticality: denotes the level of consequence associated with performing a task incorrectly. The rating scale used in this publication is presented below:

1 = slight 2 = moderate 3 = extreme

What do the assessments cover?

Specifically, the tests include multiple-choice test items over the following areas:

Computer Networking Technician (65 questions)

Demonstrate Proper Procedures and Practices for Safety in the Work Area	3%
Identify Common Electronic Components Used in Computers and Networks	2%
Read and Interpret Diagrams and Blueprints	2%
Demonstrate a Basic Understanding of Electronic Theory	2%
Evaluate Communication Techniques and Equipment	8%
Install, Evaluate, Troubleshoot, and Upgrade Computers and Peripherals	11%
Install, Evaluate, Troubleshoot, and Upgrade Networks	15%
Perform Administrative Duties	3%
Install, Upgrade, and Maintain Operating Systems	8%
Install and Maintain Computer Software Application	8%
Understand and Use Network	18%
Using Connectivity to Perform Technical Support	12%
Maintain and Troubleshoot Networks	3%
Network Security	5%

Computer Repair Technician (59 questions)

Demonstrate Proper Procedures and Practices for Safety in the Work Area	12%
Demonstrate Employability Skills	2%
Identify and Demonstrate Proper Use of Common Tools and Test Equipment	2%
Identify Common Electronic Components Used in Computers and Networks	1%
Identify Fasteners and Terminals Used in Computers and Networks and Demonstrate Proper Installation Procedures	0%
Read and Interpret Diagrams and Blueprints	2%
Demonstrate a Basic Understanding of Electronic Theory	0%
Evaluate Communications Techniques and Equipment	12%
Install, Evaluate, Troubleshoot, and Upgrade Computers and Peripherals	31%
Install, Evaluate, Troubleshoot, and Upgrade Networks	5%
Perform Administrative Duties	2%
Install, Upgrade, and Maintain Operating Systems	19%
Install and Maintain Computer Software Applications	12%
Using Connectivity to Perform Technical Support	0%

What are the benefits of using these assessments?

Students receive a certificate for each assessment that he/she passes. This certificate may be included in his/her portfolio and used to communicate the student's mastery of the subject matter to potential employers.

When should the assessments be taken?

The CareerTech Testing Center recommends that students take these assessments as soon as possible after receiving all standards-related instruction, rather than waiting until the end of the school year.

Are the assessments timed?

No. However, most students finish the assessment within one hour.

What resources can students use on these assessments?

Students are allowed to use calculators and scratch paper on CTTC assessments; however, these items must be provided by the testing proctor and returned to the proctor before the student's exam is submitted for scoring. Calculator apps on cell phones and other devices may not be used on these assessments.

What accommodations can be made for students with Individualized Education Plans (IEPs)?

Accommodations are allowed for students with an Individualized Education Plan. Examples of allowable accommodations include:

- Extended time — This assessment is not timed; therefore, students may take as much time as needed to finish. The assessment must be completed in one testing session.
- Readers — A reader may be used to read the assessment to a student who has been identified as needing this accommodation.
- Enlarged text — Students needing this accommodation can activate this feature by clicking the **AA** icon in the upper right corner of the screen.

What can students expect on Test Day?

All CTTC assessments are web-based and delivered exclusively by a proctor in the school's assessment center. The proctor **cannot** be an instructor or anyone who was involved with the student during instruction.

Assessments are delivered in a question-by-question format. When a question is presented, the student can select a response or leave the question unanswered and advance to the next question. Students may also flag questions to revisit before the test is scored. All questions must be answered before the test can be submitted for scoring.

After the assessment is scored, the student will receive a score report that not only shows the student's score on the assessment, but also how the student performed in each standard area.

Can students retake the test?

Students may retake the test unless their school or state testing policies prohibit retesting. Students who can retest must wait at least three days between test attempts.

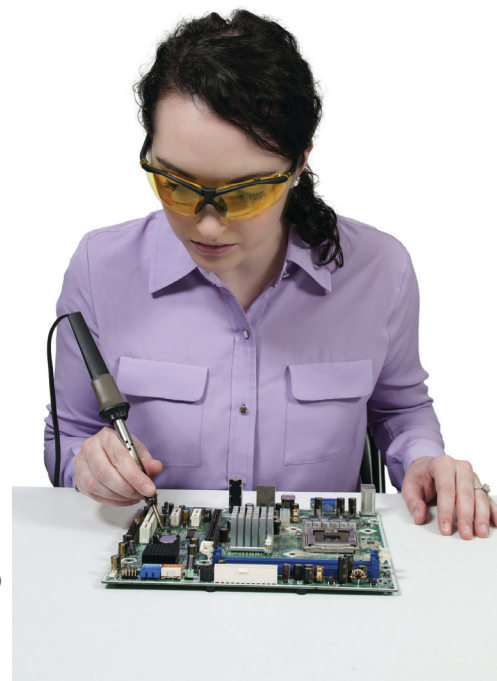


Standards and Test Content

Computer Networking Technician

Demonstrate Proper Procedures and Practices for Safety in the Work Area (2 questions)

1. Identify and practice mechanical safety **(3/3)**
 - Tool safety
 - Hand safety
 - Eye safety
2. Immediately report injuries/accidents following company procedures **(2/3)**
3. Identify and practice electrical safety **(3/3)**
4. Participate in Right to Know training and practice environmental safety **(1/3)**
 - Chemical awareness
 - Environmental regulations
 - Gases and pressure safety
5. Identify and practice safety related to infectious disease, universal **(1/3)** precautions, blood-borne pathogens, and chemical hygiene
6. Identify and practice thermal safety **(1/2)**
7. Identify and practice laser safety **(1/2)**



Identify Common Electronic Components Used in Computers and Networks (1 question)

1. Distinguish between conductors and insulators basic materials **(2/2)**
2. Identify and test cells and batteries and demonstrate proper storage and handling procedures **(1/2)**
3. Demonstrate proper handling of static-sensitive devices **(3/3)**

Read and Interpret Diagrams and Blueprints (1 question)

1. Identify and use common notations and symbols **(2/3)**
2. Use diagrams and blueprints to locate and identify specific equipment within areas **(2/3)**
3. Use diagrams and blueprints to assemble equipment, subassemblies, and peripherals **(2/2)**
4. Trace signal/power flow **(2/3)**

Demonstrate a Basic Understanding of Electronic Theory (1 question)

1. Relate electricity to nature of matter **(1/2)**
2. Identify sources of electricity **(2/2)**
3. Calculate power **(3/3)**
 - amperage
 - voltage
4. Measure properties of a circuit using a DMM **(2/3)**
5. Define magnetic properties of circuits and devices **(2/2)**
6. Identify properties of an AC signal **(2/2)**
7. Define and apply number systems to codes and arithmetic **(1/1)**
 - Binary number
 - Hexadecimal number

Evaluate Communication Technologies and Equipment (5 questions)

1. Test and troubleshoot specialized analog and digital communications devices (cable modem and DSL modem) **(1/2)**
2. Demonstrate knowledge of digital communication systems **(1/2)**
3. Demonstrate knowledge of fiber optic communication systems **(2/2)**
4. Demonstrate knowledge of wireless communication systems **(2/2)**
5. Demonstrate knowledge of analog communication system **(2/2)**

Install, Evaluate, Troubleshoot, and Upgrade Computers and Peripherals (7 questions)

1. Identify subsystems of a computer **(1/2)**
 - motherboard
 - processor
 - expansion cards
 - video card
 - hard drive
 - RAM
2. Install, troubleshoot, and analyze computer I/O systems **(1/2)**
 - Serial/DB-9
 - Bluetooth
 - Firewire
 - BNC
 - Wireless Card
 - Parallel/DB-25
 - PS2/MINI-DIN
 - HDMI
 - USB
 - Serial ATA
 - Display Port
 - SAS
 - DVI
 - VGA/DB-15
 - RJ-11
 - RF
 - RJ-45
3. Demonstrate a working knowledge of hardware used to troubleshoot computer systems **(1/2)**

4. Demonstrate a working knowledge of software used to troubleshoot computer systems **(1/2)**
5. Install and verify proper operation of computer/printer power supplies **(1/2)**
6. Install/upgrade and verify proper operation of computer BIOS/UEFI systems **(1/2)**
 - CMOS setup memory
 - Flash Bios
7. Install/upgrade and verify operation of single or multiple CPU systems **(1/2)**
8. Install and verify proper operation of storage devices (SATA, SAS, ESATA, Compact Flash, SD, Thumb Drives, M.2, NVME drives) **(1/2)**
9. Install and verify proper operation of display systems **(1/2)**
 - Single and Multiple Display Configurations
 - Touch Displays
 - Projectors
10. Install and verify proper operation of input devices **(1/2)**
 - Keyboards
 - Pointers
 - Game Pads
 - Scanners
 - Web Cams
 - Microphones
 - Biometrics
11. Install and verify proper operation of hard copy output devices **(1/2)**
 - Printers
 - Plotters
13. Install and verify proper operation of power conditioning and power back-up devices **(1/2)**
14. Research and verify hardware compatibility **(1/2)**



Install, Evaluate, Troubleshoot, and Upgrade Networks (11 questions)

1. Understand the purpose of a router **(3/3)**
2. Install and configure network interface controller **(3/3)**
3. Install and troubleshoot cables **(3/3)**
4. Demonstrate a working knowledge of network software **(3/3)**
5. Analyze, operate, troubleshoot, and install switches **(3/3)**
6. Construct and install cable connectors and interfaces **(3/3)**
7. Install and configure wireless access points and wireless clients **(3/3)**
 - Security Protocols (WEP, WPA, TKIP, Encryption Key)
 - SSID
 - 802.11
 - Wireless Standards (A, B, G, N, AC)

Perform Administrative Duties (2 questions)

1. Prepare typical work orders, logbooks, and historical records **(3/3)**
2. Research and order parts **(3/3)**
3. Maintain service documentation library **(2/3)**
4. Prepare and maintain network records **(3/3)**
 - Uptime logs
 - Access logs
 - Network traffic
 - Bandwidth
 - Disk utilization

Install, Upgrade, and Maintain Operating Systems (Windows, Linux, MAC) (5 questions)

1. Install, upgrade, and maintain operating system functions **(1/2)**
 - Advanced functions
 - Shell/Power Shell
 - Script files
 - Menus
 - File maintenance
 - Disk maintenance
 - Memory optimization
 - Hardware compatibility
2. Install and maintain Graphical User Interfaces **(1/2)**
 - Linux
 - MAC OS
 - MS Windows
3. Install, maintain, and interpret utility applications **(1/2)**
 - File systems
 - Disk drive maintenance
 - Disk optimizing
 - Memory management
4. Perform backup and restore **(3/3)**
 - Importance of backup
 - Records management requirements
 - Understand media types (disk, tape, network/cloud)
 - Types of backup strategies/scheduling
 - Full
 - Tape management
 - Incremental
 - Scheduling
 - Drive imaging
 - Differential
 - Copy
 - Off-site storage
 - Validate Backup
 - Sequential
 - Drive Imaging



Install and Maintain Computer Software Applications (5 questions)

1. Define purposes of licensing agreements **(2/3)**
 - Site
 - Stand alone
 - Multi-user
2. Identify installation requirements **(2/3)**
 - Read and interpret technical manuals
 - Software
 - Memory configurations
 - Minimum memory
 - Maximum memory
 - Monitor
 - Interaction with other software
 - Connect hardware
 - Ports
 - Peripherals
 - Hard disk requirements
3. Perform custom installations and upgrades **(2/3)**
 - Location of OS files
 - Location of program files
 - Identify proper drivers and peripheral devices
 - Location of user files
 - Modify boot files
 - File system types
 - Partition sizes
4. Change default settings **(2/3)**
 - Drive
 - Directories
 - Peripherals
5. Define start-up menu/window **(1/2)**
 - Icons
 - Path names
 - Menu options
 - Script files
 - Security
 - Password
6. Configure, install, secure, and troubleshoot network applications software (DNS, DHCP) **(3/3)**
7. Configure, install, secure, and troubleshoot threat detection software (malware, etc.) **(2/3)**

Understand and Use Networks (12 questions)

1. Understand network design concepts **(3/3)**
 - Logical
 - Physical
 - Topology
 - Protocols (DNS, DHCP, ARP, etc.)
 - Difference between LAN and WAN
 - Benefits of networking
 - Components of a local area network
 - Network addressing
 - Wireless
 - Client-server model
 - Host-based
 - Clustering & load balancing
2. Understand network software **(3/3)**
 - Relationship of network operating systems and desktop operating systems
 - Protocols
 - Difference between network operating systems and integrated environments
 - Describe versions of Windows Server, Linux/Unix
 - Directory services (LDAP, active directory)

- Default & inherited rights
 - Security
 - Network sharing technologies
3. Create and maintain directory structure **(3/3)**
 - Default directories
 - Program directories
 - Create additional volumes
 - User directories
 - Paths
 4. Construct and maintain drive mappings **(3/3)**
 - Drive pointers
 - Network drives
 - Search drives
 - Logical drives
 5. Define and implement login scripts **(3/3)**
 - System log-in script
 - User log-in script
 6. Create users and assign security **(3/3)**
 - Purpose and role of attributes
 - Add a user
 - Home directory
 - Create users directory
 - Groups
 - Work group managers
 - Trustee directory rights assignments
 - File rights assignments
 - Supervisor options
 - Security accounting
 - Passwords
 - Apply assorted file attributes and permissions
 7. Set-up and initialize printers **(3/3)**
 - Define connection
 - Serial
 - Parallel
 - Network-based
 - USB
 - Fire wire
 8. Use file server management **(3/3)**
 9. Document network structure **(3/3)**
 - Hardware
 - Network topology
 - Software
 10. Manage utilization of resources **(3/3)**
 - Disks
 - Network traffic
 - CPU/processor utilization
 - Memory
 11. Identify the layers of the OSI & TCP/IP model and their functions **(3/3)**
 12. Set up and maintain a TCP/IP network **(3/3)**
 - Dynamic v. Static Addressing
 - IP Address
 - DNS
 - Subnet Mask
 - Default Gateway
 13. Design and implement a subnet **(3/3)**
 - Class A
 - Class B
 - Class C
 - Class D



14. Describe principles of fault tolerance **(3/3)**

- Power
- Redundancy
- Storage
- Services

15. Describe characteristics of disaster recovery **(3/3)**

- Backup and restore
- Off-site storage
- Contingency plan
- Hot and cold spares
- Hot, warm and cold sites
- RTO/RPO

Using Connectivity to Perform Technical Support (8 questions)

1. Describe the general structure of the Internet **(2/3)**

- Components of the Internet
- Compare and contrast internal local area networks/intranets

2. Describe types of services available on the Internet **(2/3)**

- E-mail
- File transfer protocol (FTP)
- VPN
- Instant Messaging
- Video Streaming
- World Wide Web
- VOIP

3. Define Internet terminology **(2/3)**

- Simple Messaging Transport Protocol (SMTP)
- Universal Resource Locator (URL)
- Hyper Text Markup Language (HTML)
- File Transfer Protocol (FTP)
- Hyper Text Transport Protocol (HTTP)
- VPN
- Transport Control Protocol/Internet Protocol (TCP/IP)
- Internet Service Provider (ISP)
- DNS
- DHCP
- HTTPS
- TFTP
- SSL

4. Understand how to access the Internet **(2/3)**

- Install and operate multiple browsers
- Online services
 - DSL
 - Mobile Hot Spot
 - Cable
- Internet Service Provider
 - POTS
 - Satellite

5. Understand and use basic e-mail concepts **(2/3)**

- Send and receive e-mail messages
- Sending a file attached with an e-mail messages
- E-mail address conventions
- E-mail reader

6. Understand and use basic FTP concepts **(2/3)**

- Connect/disconnect to a FTP site
- Browse available files
- Retrieve a file using FTP
- Send a file using FTP

7. Understand and use basic Web site concepts **(2/3)**

- Web address/URL
- Web page
- Hypertext links



8. Understand and use a Web browser **(2/3)**
 - Access multiple Web sites
 - Add bookmarks
 - Move between active Web pages
 - Web browser
9. Understand how to find information on the Web using search engines **(2/3)**
 - Define how search engines work
 - Understand the different search engines available
 - Search the World Wide Web
10. Demonstrate awareness of safety and security issues of internet use **(3/3)**
 - Virus/malware
 - Security patches
 - Susceptibility to virus
 - Phishing

Troubleshooting Networks (2 questions)

1. Demonstrate a working knowledge of hardware used to troubleshoot networks **(3/3)**
 - Link lights
 - Tone and probe
 - Cable testers
 - Network analyzers
2. Demonstrate a working knowledge of software used to troubleshoot networks **(3/3)**
 - NS Lookup
 - Network Sniffers
 - nbt stat
 - ipconfig/ifconfig
 - tracert/traceroute
 - ping
 - arp
 - netstat

Implement Network Security (3 questions)

1. Identify IT system security threats **(3/3)**
 - Social engineering attacks
 - Port scan attacks
 - Hardware attacks
2. Harden internal IT systems and services **(3/3)**
 - Operating system
 - Directory services
 - Firewall
 - DHCP server
 - File and print servers
3. Harden internetwork devices and services **(1/3)**
 - Internetwork connection devices
 - DNS and BIND servers
 - Web servers
 - FTP servers
 - NNTP servers
 - Email servers
 - Conferencing and messaging servers
4. Implement network communications **(2/3)**
 - Secure network traffic using IPSec
 - Secure wireless traffic
 - Secure client Internet access
 - Secure remote access to devices

5. Manage Public Key Infrastructure (PKI) and certificates **(1/3)**

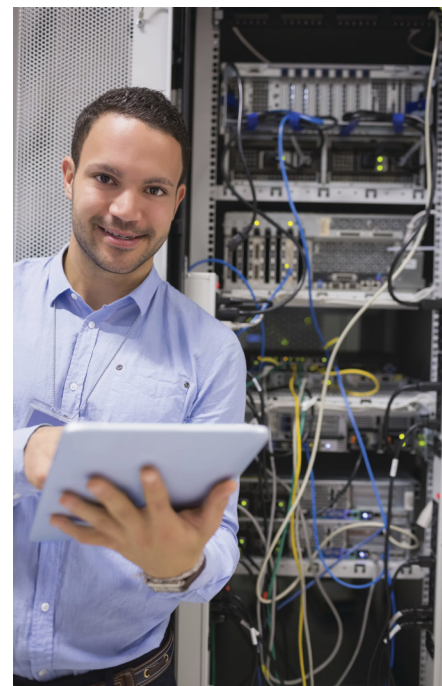
- Install a Certificate Authority (CA) hierarchy
- Harden a Certificate Authority
- Back up CAs
- Restore the CA
- Enroll certificates for entities
- Secure network traffic using certificates
- Renew certificates
- Revoke certificates
- Back up certificates and private keys
- Restore certificates and private keys

6. Enforce organizational security policies **(1/3)**

- Develop an organizational security policy
- Apply an organizational security policy
- Enforce organizational security policy compliance
- Enforce physical security compliance
- Educate users

7. Monitor the security infrastructure **(3/3)**

- Run vulnerability scans
- Monitor for intruders
- Set up a honeypot
- Respond to security incidents



Standards and Test Content

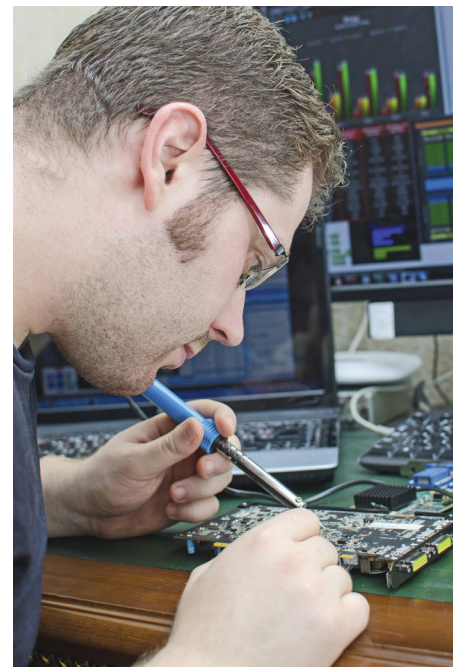
Computer Repair and Support Technician

Demonstrate Proper Procedures and Practices for Safety in the Work Area (6 questions)

1. Identify and practice mechanical safety **(3/3)**
 - Tool safety
 - Hand safety
 - Eye safety
2. Immediately report injuries/accidents following company procedures **(2/3)**
3. Identify and practice electrical safety **(3/3)**
4. Participate in Right to Know training and practice environmental safety **(1/3)**
 - Chemical awareness
 - Environmental regulations
 - Gases and pressure safety
5. Identify and practice safety related to infectious disease, universal precautions, blood-borne pathogens, and chemical hygiene **(1/3)**
6. Identify and practice thermal safety (laser printer) **(1/1)**
7. Identify and practice laser safety **(1/1)**

Demonstrate Employability Skills (3 question)

1. Maintain a courteous and responsible attitude toward all customers **(3/3)**
2. Demonstrate appropriate interpersonal skills **(2/3)**
3. Maintain self-esteem in self and others **(2/3)**
 - Analyze personal space and needs
 - Interpret emotional reactions
 - Determine values scale and attitudes
 - Cope with changes
 - Interpret sensory clues
4. Recognize the importance of teamwork and participate as a team member
 - Participate in team (group) meetings **(3/3)**
 - Focus on topic and purpose of the meeting
 - Offer facts and ideas
 - Help others contribute facts and ideas
 - Pass on good ideas
 - Look for ways to help others
 - Give recognition for things well done
 - Let others know what you need to get the job done
5. Maintain professional respect for supervisor and co-workers **(3/3)**



6. Use professionalism **(3/3)**
 - Follow facility dress code
 - Exhibit positive attitude
 - Exhibit initiative
 - Exhibit loyalty
 - Exhibit respect for others
 - Exhibit flexibility
 - Exhibit commitment
 - Practice hygiene
7. Use critical thinking skills in workplace situations **(3/3)**
 - Use deductive and inductive reasoning skills
 - Distinguish appropriateness of equipment and tests
 - Decision making
 - Creativity
 - Use quality performance processes
 - Use tools to analyze information
 - Use basic statistical concepts and analysis
 - Create charts
 - Create histograms
 - Create flow charts
 - Use quality tools
 - Evaluate stressful situations
 - Evaluate how to manage ethical conflicts
8. Maintain satisfactory attendance **(3/3)**
 - Punctuality
 - Early departure
 - Absence
 - Calling in
9. Use stress management techniques **(2/3)**
10. Function within the organizational structure **(2/3)**
 - Chain of command
 - Amount of empowerment
11. Distinguish the departments within the organization **(1/1)**
12. Distinguish the roles of the organizational members **(1/2)**
13. Use self-management and time management techniques **(3/3)**
 - Independence
 - Self-evaluation
 - Leadership skills
 - Supervision
 - Delegation
 - Organization
 - Prioritization
 - Initiative
14. Use proper telephone etiquette **(3/3)**
 - Project positive telephone image
 - Manage incoming telephone calls
 - Receive incoming calls
 - Screen incoming calls
 - Transfer incoming calls when indicated
 - Manage multiple incoming calls
 - Use telephone log or computerized system
 - Manage telephone calls
 - Inquiries

18. Interpret and follow oral directions **(3/3)**
19. Use job-related terminology, symbols, and abbreviations. Also avoid jargon and non-standard abbreviations. **(3/3)**
20. Use basic keyboarding skills and computer skills **(3/3)**
 - E-mail
 - Basic internet usage
 - Office based software
 - Client based operating system
21. Use effective communication techniques with peers, co-workers, and customers **(3/3)**
 - Pronounce words distinctly
22. Use verbal and non-verbal communication techniques **(3/3)**
23. Apply behavioral management techniques to workplace situations **(3/3)**
 - Use personal coping skills
 - Deal with customers and co-worker attitudes
 - Exhibit a sense of humor
 - Use positive feedback techniques
 - Emphasize strengths
 - Use constructive criticism
24. Identify personal and work-related goals and monitor progress **(1/2)**
 - Chart and set long, medium, and short term goals
 - Determine educational needs
 - Set professional goals
 - Set personal goals
25. Respond to compliments, complaints, conflicts, and criticism appropriately **(2/3)**
26. Compile research data **(3/3)**
 - Use online research tools
27. Use negotiation skills **(3/3)**
 - Interpret how to reasonably disagree
 - Interpret ways to overcome objections
 - Solve everyday human relations problems
28. Use career development skills **(1/3)**
 - Write cover/application letter
 - Complete job application
 - Interpret Form W-2
 - Create a resume
 - Explore career opportunities
 - Compare career options
 - Develop a personal career plan
 - Negotiate salary and benefits
29. Use multi-cultural sensitivity skills **(2/2)**
 - Recognize and respect diverse customs and accommodate them in the work environment

Identify and Demonstrate Proper Use of Common Tools and Test Equipment (3 questions)

1. Demonstrate proper use of hand tools **(3/3)**
2. Use a digital multimeter to measure **(2/3)**
 - Voltage
 - Current
 - Resistance
3. Use an AC circuit polarity tester **(1/2)**
4. Demonstrate knowledge of cable tester **(1/3)**



Identify Common Electronic Components Used in Computers and Networks (2 questions)

1. Distinguish between conductors and insulators **(2/2)**
 - Basic materials
2. Identify and test cells and batteries and demonstrate proper storage and handling procedures **(1/2)**
3. Demonstrate proper handling of static-sensitive devices **(3/3)**

Identify Fasteners and Terminals Used in Computers and Networks and Demonstrate Proper Installation Procedures (0 questions)

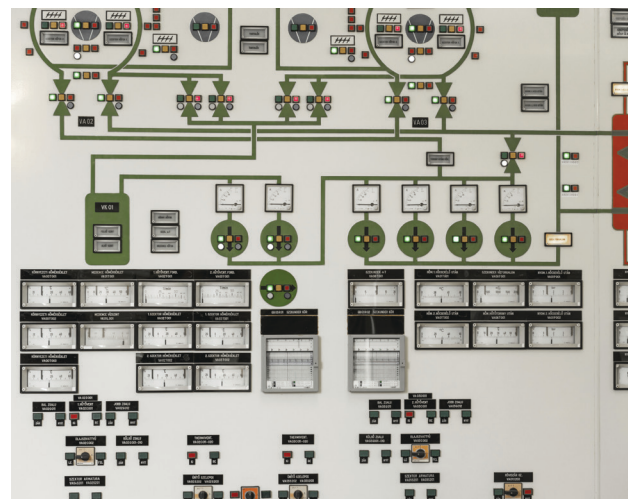
1. Identify types of fasteners and terminals **(2/2)**
2. Demonstrate use of fasteners and terminals **(2/2)**
3. Differentiate between types and sizes of screws **(2/1)**

Read and Interpret Diagrams and Blueprints (1 question)

1. Identify and use common notations and symbols **(2/3)**
2. Use diagrams and blueprints to locate and identify specific equipment within areas **(2/3)**
3. Use diagrams and blueprints to assemble equipment, subassemblies, and peripherals **(2/2)**
4. Trace signal/power flow **(2/3)**

Demonstrate a Basic Understanding of Electronic Theory (0 questions)

1. Relate electricity to nature of matter **(2/1)**
2. Identify sources of electricity **(2/2)**
3. Calculate power **(3/3)**
 - amperage
 - voltage
4. Measure properties of a circuit using a DMM **(2/3)**
5. Define magnetic properties of circuits and devices **(2/2)**
6. Identify properties of an AC signal **(2/2)**
7. Define and apply number systems to codes and arithmetic **(1/1)**
 - Binary number
 - Hexadecimal number



Evaluate Communication Technologies and Equipment (7 Questions)

1. Test and troubleshoot specialized analog and digital communication devices (cable, modem and DSL modem) **(3/3)**
2. Demonstrate knowledge of digital communication systems **(3/3)**
3. Demonstrate knowledge of fiber optic communication systems **(2/2)**
4. Demonstrate knowledge of wireless communication systems **(2/2)**
5. Demonstrate knowledge of analog communication systems **(2/2)**

Install, Evaluate, Troubleshoot, and Upgrade Computers and Peripherals (17 questions)

1. Identify subsystems of a computer **(3/3)**
2. Install, troubleshoot, and analyze computer I/O systems **(3/3)**
 - Serial/DB-9
 - Bluetooth
 - Firewire
 - BNC
 - Wireless Card
 - Parallel/DB-25
 - PS2/MINI-DIN
 - HDMI
 - USB
 - Serial ATA
 - Display Port
 - SAS
 - DVI
 - VGA/DB-15
 - RJ-11
 - RF
 - RJ-45
3. Demonstrate a working knowledge of hardware used to troubleshoot computer systems **(3/3)**
4. Demonstrate a working knowledge of software used to troubleshoot computer systems **(3/3)**
5. Install and verify proper operation of computer/printer power supplies **(3/3)**

6. Install/upgrade and verify proper operation of computer Bios/UEFI systems **(3/3)**
 - CMOS setup memory
 - Flash BIOS
7. Install/upgrade and verify operation of single or multiple CPU systems **(2/3)**
8. Install and verify proper operation of storage devices (SATA, SAS, ESATA, Compact Flash, SD, Thumb Drives, M.2, NVME drives) **(3/3)**
9. Install and verify proper operation of display systems **(3/3)**
 - Touch Displays
 - Projectors
 - Single and Multiple Display Configurations
10. Install and verify proper operation of input devices **(3/3)**
 - Keyboards
 - Web Cams
 - Pointers
 - Microphones
 - Game Pads
 - Biometrics
 - Scanners
11. Install and verify proper operation of hard copy output devices **(3/3)**
 - Printers
 - Plotters
12. Install and verify proper operation of power conditioning and power back-up devices **(3/3)**
13. Research and verify hardware compatibility **(3/3)**
14. Identify, install, and verify proper operating system components **(3/3)**
 - Battery
 - PCMCIA Type I, II, III card
 - Hardware
 - Memory



Install, Evaluate, Troubleshoot, and Upgrade Networks (3 questions)

1. Understand the purpose of a router **(3/3)**
2. Install and configure network interface controller **(3/3)**
3. Construct/install and troubleshoot cables **(3/3)**
4. Demonstrate a working knowledge of network software **(3/3)**
5. Analyze, operate, troubleshoot, and install switches **(3/3)**
6. Construct and install cable connectors and interfaces **(3/3)**
 - Fiber optic
 - Twisted pair
 - Coax
7. Understand network design concepts **(3/3)**
 - Topology
 - Protocols
 - Components of a local area network
 - Difference between LAN and WAN
 - Benefits of networking
 - Client server
 - OSI Model
 - Host-based
 - Peer-to-peer
8. Demonstrate a working knowledge of equipment used to test network connection **(3/3)**
 - Loopback plug
 - Multimeter
 - OTDR

Perform Administrative Duties (1 question)

1. Prepare typical work orders, logbooks, and historical records **(3/3)**
2. Research and order parts **(3/3)**
3. Maintain service documentation library **(2/3)**
4. Prepare and maintain network records **(3/3)**
 - Uptime logs
 - Access logs
 - Network traffic
 - Bandwidth
 - Disk utilization

Install, Upgrade, and Maintain Operating Systems (10 questions)

1. Install, upgrade, and maintain operating system functions **(3/3)**
 - Advanced functions
 - Shell/Power Shell
 - Script files
 - Menus
 - File maintenance
 - Disk maintenance
 - Memory optimization
 - Hardware compatibility
2. Install and maintain Graphical User Interfaces **(3/3)**
 - Linux
 - MAC OS
 - MS Windows
3. Install, maintain, and interpret utility applications **(3/3)**
 - File systems
 - Disk drive maintenance
 - Disk optimizing
 - Memory management
4. Perform backup and restore **(3/3)**
 - Importance of backup
 - Records management requirements
 - Copy
 - Understand media types (disk, tape, Network/Cloud)
 - Types of backup strategies/scheduling
 - Full
 - Tape management
 - Incremental
 - Scheduling
 - Drive imaging
 - Differential
 - Off-site storage
 - Validate Backup
 - Sequential
 - Drive Imaging

Install and Maintain Computer Software Applications (6 questions)

1. Define purposes of licensing agreements **(2/3)**
 - Site
 - Stand alone
 - Multi-user
2. Identify installation requirements **(2/3)**
 - Read and interpret technical manuals
 - Software
 - Interaction with other software
 - Connect hardware

- Memory configurations
 - Minimum
 - Maximum
 - Hard disk requirements
3. Perform custom installations and upgrades **(2/3)**
- Location of OS files
 - Location of program files
 - Identify proper drivers and peripheral devices
 - File system types
 - Location of user files
4. Change default settings **(2/3)**
- Drive
 - Directories
5. Define start-up menu/window **(2/3)**
- Icons
 - Path names
 - Menu options
6. Install, update, and configure malware **(3/3)**

- Ports
- Peripherals
- Monitor

- Modify boot files
- Partition sizes
- Location of user files

- Peripherals

- Script files
- Security
- Password



Using Connectivity to Perform Technical Support (0 questions)

1. Describe the general structure of the Internet **(2/3)**
- Components of the Internet
 - Compare and contrast internal local area networks/intranets
2. Describe types of services available on the Internet **(2/3)**
- E-mail
 - File transfer protocol (FTP)
 - VPN
 - Instant Messaging
 - Video Streaming
 - World Wide Web
 - VOIP
3. Define Internet terminology **(2/3)**
- Simple Messaging Transport Protocol (SMTP)
 - Universal Resource Locator (URL)
 - Hyper Text Markup Language (HTML)
 - File Transfer Protocol (FTP)
 - Hyper Text Transport Protocol (HTTP)
 - VPN
 - Transport Control Protocol/Internet Protocol (TCP/IP)
 - Internet Service Provider (ISP)
 - DNS
 - DHCP
 - HTTPS
 - TFTP
 - SSL
4. Understand how to access the Internet **(2/3)**
- Install and operate multiple browsers
 - Online services
 - DSL
 - Mobile Hot Spot
 - Cable
 - Internet Service Provider
 - POTS
 - Satellite

5. Understand and use basic e-mail concepts **(2/3)**
 - Send and receive e-mail messages
 - Sending a file attached with an e-mail message
 - E-mail address conventions
 - E-mail reader
6. Understand and use basic FTP concepts **(2/3)**
 - Connect/disconnect to a FTP site
 - Browse available files
 - Retrieve a file using FTP
 - Send a file using FTP
7. Understand and use basic Web site concepts **(2/3)**
 - Web address/URL
 - Web page
 - Hypertext links
8. Understand and use a Web browser **(2/3)**
 - Access multiple Web sites
 - Add bookmarks
 - Move between active Web pages
 - Web browser
9. Understand how to find information on the Web using search engines **(2/3)**
 - Define how search engines work
 - Understand the different search engines available
 - Search the World Wide Web
10. Demonstrate awareness of safety and security issues of internet use **(2/3)**
 - Virus/malware
 - Security patches
 - Susceptibility to virus
 - Phishing

Sample Questions

- _____ 1. The primary reason for using a heat sink when soldering is to:
- a. clean the soldering iron.
 - b. control the heat output of the soldering iron.
 - c. protect the technician from burns.
 - d. shunt heat away from heat-sensitive components.
- _____ 2. An interruption in an electrical circuit is known as a/an:
- a. ground.
 - b. open.
 - c. short.
 - d. switch.
- _____ 3. Which of the following materials is the poorest conductor of electricity?
- a. copper
 - b. cotton
 - c. silver
 - d. tin
- _____ 4. 1024 bytes is equal to:
- a. 1 gigabyte.
 - b. 1 kilobyte.
 - c. 1 megabyte.
 - d. 1 terabyte.
- _____ 5. Which of the following problems is caused by a sudden loss of power?
- a. data loss
 - b. electric shock
 - c. monitor damage
 - d. ram damage
- _____ 6. What frequency does a 802.11g wireless device use?
- a. 300 MHz
 - b. 900 MHz
 - c. 2.4 GHz
 - d. GHz

- _____ 7. Which I/O address is assigned to com port 3?
- a. 2E8H
 - b. 2F8H
 - c. 3E8H
 - d. 3F8H
- _____ 8. What must be done when stacking three switches?
- a. connect switch A to switch B, and switch B to switch C
 - b. connect switch A to switch B, and switch A to switch C
 - c. connect switch B to switch C, and switch A to switch C
 - d. connect switch B to switch C, and switch C to switch A
- _____ 9. Which of the following devices connects network segments and allows full bandwidth for communication?
- a. hub
 - b. NIC
 - c. splitter
 - d. switch
- _____ 10. File transfer using FTP requires a server and a:
- a. client.
 - b. PPP.
 - c. PPPoE.
 - d. source.



Sample Questions — Key

1. The primary reason for using a heat sink when soldering is to:
- a. clean the soldering iron. Incorrect
 - b. control the heat output of the soldering iron. Incorrect
 - c. protect the technician from burns. Incorrect
 - d. shunt heat away from heat-sensitive components. Correct
2. An interruption in an electrical circuit is known as a/an:
- a. ground. Incorrect
 - b. open. Correct
 - c. short. Incorrect
 - d. switch. Incorrect
3. Which of the following materials is the poorest conductor of electricity?
- a. copper Incorrect
 - b. cotton Correct
 - c. silver Incorrect
 - d. tin Incorrect
4. 1024 bytes is equal to:
- a. 1 gigabyte. Incorrect
 - b. 1 kilobyte. Correct
 - c. 1 megabyte. Incorrect
 - d. 1 terabyte. Incorrect
5. Which of the following problems is caused by a sudden loss of power?
- a. data loss Correct
 - b. electric shock Incorrect
 - c. monitor damage Incorrect
 - d. ram damage Incorrect
6. What frequency does a 802.11g wireless device use?
- a. 300 MHz Incorrect
 - b. 900 MHz Incorrect
 - c. 2.4 GHz Correct
 - d. GHz Incorrect

7. Which I/O address is assigned to com port 3?

- a. 2E8H Incorrect
- b. 2F8H Incorrect
- c. 3E8H Correct
- d. 3F8H Incorrect

8. What must be done when stacking three switches?

- a. connect switch A to switch B, and switch B to switch C Incorrect
- b. connect switch A to switch B, and switch A to switch C Correct
- c. connect switch B to switch C, and switch A to switch C Incorrect
- d. connect switch B to switch C, and switch C to switch A Incorrect

9. Which of the following devices can connects network segments and allows full bandwidth for communication?

- a. hub Incorrect
- b. NIC Incorrect
- c. splitter Incorrect
- d. switch Correct

10. File transfer using FTP requires a server and a:

- a. client. Correct
- b. PPP. Incorrect
- c. PPPoE. Incorrect
- d. source. Incorrect

Computer Networking Technician Crosswalk

Directions: The purpose of this crosswalk is to identify where the information technology knowledge and skills for this outcome are currently being taught and addressed. Use the space provided to indicate the specific course where each skill is taught and assessed. Indicate the type of assessment that takes place in the course as follows:

T if Textbook based

O if resource is online (software, website, online course, etc.)

P if resource is project-based

Competencies	Name of Resource	Type	Page #
Demonstrate Proper Procedures and Practices for Safety in the Work Area (2 questions)			
Identify and practice mechanical safety • Tool safety • Hand safety • Eye safety	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Immediately report injuries/accidents following company procedures	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Identify and practice electrical safety	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Participate in Right to Know training and practice environmental safety • Chemical awareness • Environmental regulations • Gases and pressure safety	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Identify and practice safety related to infectious disease, universal precautions, blood-borne pathogens, and chemical hygiene			
Identify and practice thermal safety	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Identify and practice laser safety	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Identify Common Electronic Components Used in Computers and Networks (1 question)			
Distinguish between conductors and insulators basic materials	Comptia 220-901 Exam Objectives: (Hardware)	1.0	6
Identify and test cells and batteries and demonstrate proper storage and handling procedures	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate proper handling of static-sensitive devices	Comptia 220-901 Exam Objectives: (Hardware)	1.0	6
Read and Interpret Diagrams and Blueprints (1 question)			
Identify and use common notations and symbols	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Use diagrams and blueprints to locate and identify specific equipment within areas	Comptia 220-901 Exam Objectives: (Networking)	2.0	10

Competencies	Name of Resource	Type	Page #
Use diagrams and blueprints to assemble equipment, subassemblies, and peripherals	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Trace signal/power flow	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Network Equipment Diagrams	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate a Basic Understanding of Electronic Theory (1 question)			
Relate electricity to nature of matter	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Identify sources of electricity	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Apply and relate Ohms Law			
Measure properties of a circuit using a DMM	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Define magnetic properties of circuits and devices			
Identify properties of an AC signal	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Define and apply number systems to codes and arithmetic • Binary number • Hexadecimal number	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Analyze and troubleshoot series circuits and devices			
Evaluate Communications Technologies and Equipment (4 questions)			
Test and troubleshoot specialized analog and digital communications techniques (various pulse modulations, Cable modem, faxes, ADSL)	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate knowledge of digital communication systems	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate knowledge of fiber optic communication systems	Comptia 220-901 Exam Objectives: (Networking) Comptia 220-901 Exam Objectives: (Networking)	2.0 2.0	9 9
Demonstrate knowledge of wireless communication systems	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	3.0	10
Demonstrate knowledge of analog communication system			
Install, Evaluate, Troubleshoot, and Upgrade Computers and Peripherals (5 questions)			
Identify subsystems of a computer • Motherboard • Processor • Expansion Slots • Video Card • RAM	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-901 Exam Objectives: : (Hardware & Network Troubleshooting)	1.0 4.0	4 13

Competencies	Name of Resource	Type	Page #
Install, troubleshoot, and analyze computer I/O systems • Serial • RJ-45 • Firewire • BNC • Parallel • PS2/MINI-DIN • USB • Serial ATA • Various versions of SCSI • HDMI • IDE • DVI • VGA • RF • Display Port (DPI) • Wireless Card • RJ-11	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-901 Exam Objectives: (Networking)	1.0 2.0	4 9
Demonstrate a working knowledge of hardware used to troubleshoot computer systems	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate a working knowledge of software used to troubleshoot computer systems	Comptia 220-902 Exam Objectives: (Software Troubleshooting)	4.0	11
Install and verify proper operation of computer power supplies	Comptia 220-901 Exam Objectives: (Hardware)	1.0	6
Install/upgrade and verify proper operation of computer BIOS Systems/UEFI • CMOS setup memory • Flash Bios	Comptia 220-901 Exam Objectives: (Hardware) Given a scenario, configure settings and use BIOS/UEFI tools on a PC Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	1.0 3.0	4 10
Install and verify proper operation of multiple CPU systems	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-901 Exam Objectives: (Hardware & Network Troubleshooting)	1.0 4.0	5 13
Install and verify proper operation of storage devices • SATA • Compact Flash • ESATA • SD • Thumb Drives • M.2 • NVME	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-901 Exam Objectives: (Hardware & Network Troubleshooting)	1.0 4.0	4 13
Install and verify proper operation of display systems • Single & Multi head displays • Projectors • Touch Displays	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-901 Exam Objectives: (Hardware & Network Troubleshooting)	1.0 4.0	7 13
Install and verify proper operation of input devices • Keyboards • Web Cam • Scanners • Gaming Pads • Biometrics • Mouse • Mics	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-902 Exam Objectives: (Security)	1.0 3.0	7 9
Install and verify proper operation of hard copy output devices • Printers • Plotters	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-901 Exam Objectives: (Hardware & Network Troubleshooting)	1.0 4.0	7 14

Competencies	Name of Resource	Type	Page #
Install and verify proper operation of power conditioning and power back-up devices	Comptia 220-901 Exam Objectives: : (Hardware & Network Troubleshooting)	4.0	13
Research and verify hardware compatibility	Comptia 220-901 Exam Objectives: (Hardware)	1.0	4
Install, Evaluate, Troubleshoot, and Upgrade Networks (8 questions)			
Understand the Purpose of a Router	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Install and configure network interface controllers	Comptia 220-902 Exam Objectives: (Hardware)	1.0	6
Install and troubleshoot cables	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Demonstrate a working knowledge of network software	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
Analyze, operate, troubleshoot, and install switches	Comptia 220-901 Exam Objectives: : (Hardware & Network Troubleshooting)	4.0	14
Construct and install cable connectors and interfaces	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Install and configure wireless access points and wireless clients • Security Protocols (WEP,WPA,TKIP, Encryption Key) • SSID • IEEE 802.11 Standards	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Perform Administrative Duties (1 question)			
Prepare typical work orders, logbooks, and historical records	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Research and order parts	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Maintain service documentation library	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Prepare and maintain network records • Uptime logs • Bandwidth • Access logs • Disk utilization • Network traffic	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Install, Upgrade, and Maintain Operating Systems(Windows, Linux, MAC) (3 questions)			
Install, upgrade, and maintain operating system functions • Advanced functions • File maintenance • Powershell - Bash • Disk maintenance • Script files • Memory optimization • Menus • Hardware compatibility	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technolgy)	1.0 2.0	4 7
Install and maintain GUI user interface	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technolgy)	1.0 2.0	4 7

Competencies	Name of Resource	Type	Page #
Install, maintain, and interpret utility applications	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
• File Systems	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	2.0	7
• Disk drive maintenance	Comptia 220-901 Exam Objectives: (Hardware)	1.0	5
• Memory management			
• Disk optimizing			
Perform backup & restore	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
• Importance of backup & restore	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	2.0	6
• Drive imaging			
• Records management requirements			
• Differential			
• Understand media types (disk, tape, cloud, network)			
• Validating backup			
• Copy			
• Sequential			
• Types of backup strategies/scheduling			
– Full			
– Incremental			
• Off-site storage			
Install and Maintain Computer Software Applications (5 questions)			
Define purposes of licensing agreements	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	
• Site	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	2.0	
• Multi-user			
• Stand alone/Single Seat			
Identify installation requirements	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
• Read and interpret technical manuals			
• Interaction with other software			
• Software			
• Connect hardware			
• Memory configurations			
• Base memory			
• Ports			
• Upper memory			
• Peripherals			
• Monitor			
• Hard disk requirements			
Perform custom installations and upgrades	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
• Location of User files			
• Modify boot files			
• Location of program files			
• File system types			
• Identify proper drivers and peripheral devices			
• Partition sizes			
Change default settings	Comptia 220-901 Exam Objectives: (Hardware)	1.0	4
• Drive			
• Peripherals			
• Directories			
Define start-up menu/window	Comptia 220-902 Exam Objectives: (Security)	3.0	10
• Icons			
• Script files			
• Path names			
• Security			
• Menu options			
• Password			
Configure, install, secure, and troubleshoot network applications software	Comptia 220-902 Exam Objectives: (Security)	3.0	10

Competencies	Name of Resource	Type	Page #
Configure, install, secure, and troubleshoot software threat detection	Comptia 220-902 Exam Objectives: (Security)	3.0	10
Understand and Use Networks (11 questions)			
Understand network design concepts • Logical • Network addressing • Physical • Wireless • Topology • Client/Server Model • Protocols • Host-based • Difference between LAN and WAN	Comptia 220-901 Exam Objectives: (Networking) Comptia 220-902 Exam Objectives: (Security)	2.0 3.7	10 7 10
Understand network software • Relationship of network operating systems and desktop operating systems • Protocols — DNS, DHCP etc. • Difference between network operating systems and integrated environments • Describe versions of MAC, Windows Server, Linux/Unix and integrated environments • Directory services (LDAP, active directory) • Default & inherited rights • Security • Network Sharing Technologies	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	1.0 2.0	4 7
Create and maintain directory structure • Default directories • User directories • Program directories • Path • Create additional volumes	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	1.0 2.0	4 7
Construct and maintain drive mappings • Drive pointers • Network drives • Logical drives	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	1.0 2.0	4 7
Define and implement login scripts • System log-in script • User log-in script	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	1.0 2.0	4 7

Competencies	Name of Resource	Type	Page #
Create users and assign security • Purpose and role of attributes • Trustee directory rights assignments • Add a user • File rights assignments • Home directory • Supervisor options • Create users directory • Security accounting • Groups • Passwords • Work group managers • Apply assorted file attributes and permissions	Comptia 220-902 Exam Objectives: (Security)	3.0	9
Set-up and initialize printers • Define connection • USB • Network-based • Parallel • Serial • Fire wire	Comptia 220-901 Exam Objectives: (Hardware)	1.0	8
Use file server management utilities	Comptia 220-902 Exam Objectives: (Hardware) Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0 1.0	5
Document network structure • Hardware • Software • Network topology	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Manage utilization of resources • Disks • CPU/processor utilization • Network traffic • Memory	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technologies)	2.0	7
Identify the layers of the OSI & TCP/IP model and their functions	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Set up and maintain a TCP/IP network • Dynamic v. Static Addressing • Subnet Mask • IP Address • Default Gateway • DNS	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-901 Exam Objectives: (Networking)	1.0 2.0	6 9
Design and implement a subnet • Class A • Class B • Class C • Class D	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Describe principles of fault tolerance • Power • Redundancy • Storage • Services	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13

Competencies	Name of Resource	Type	Page #
Describe characteristics of disaster recovery • Backup and restore • Hot and cold spares • Off-site storage • Hot, warm and cold sites • Contingency plan • RPO & RTO	Comptia 220-902 Exam Objectives: (Windows Operating systems)	1.0	6
Using Connectivity to Perform Technical Support (8 questions)			
Describe the general structure of the Internet • Components of the Internet • Compare and contrast online services	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Describe types of services available on the Internet • E-mail • VOIP • File transfer protocol (FTP) • World Wide Web • Video Streaming • VPN • Instant Messing	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Define Internet terminology • Simple Messaging Transport Protocol (SMTP) • Internet Service Provider (ISP) • Universal Resource Locator (URL) • DNS • Hyper Text Markup Language (HTML) • DHCP • File Transfer Protocol (FTP) • HTTPS • Hyper Text Transport Protocol (HTTP) • TFTP • VPN • SSL • Transport Control Protocol/Internet Protocol (TCP/IP)	Comptia 220-901 Exam Objectives: (Networking) Comptia 220-902 Exam Objectives: (Security)	2.0 3.0	9 9
Understand how to access the Internet • Install and operate multiple browsers • Internet Service Provider • Online services – Satellite, DSL, Cable, Mobile Hot Spots, and POTS	Comptia 220-902 Exam Objectives: (Hardware) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technologies) Comptia 220-901 Exam Objectives: (Networking) Comptia 220-901 Exam Objectives: (Moblie Devices)	1.0 2.0 2.0 3.0	5 8 10 12
Understand and use basic e-mail concepts • Send and receive e-mail messages • E-mail address conventions • Sending a file attached with an e-mail message • Email reader	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technologies)	2.0	8

Competencies	Name of Resource	Type	Page #
Understand and use basic FTP concepts • Connect/disconnect to a FTP site • Retrieve a file using FTP • Browse available files • Send a file using FTP	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Understand and use basic Web site concepts • Web address - URL • Hypertext links • Web page	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Understand and use a Web browser • Access multiple Web sites • Move between active Web pages • Add bookmarks	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Understand how to find information on the Web using search engines • Define how search engines work • Search the World Wide Web • Understand the different search engines available	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	1.0 2.0	4 7
Demonstrate awareness of safety and security issues of internet use • Virus/Malware • Susceptibility to virus • Firewall/filtering software • Phishing • Security Patches	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Security) Comptia 220-902 Exam Objectives: (Software Troubleshooting)	1.0 3.0 4.0	5 9 11
Troubleshooting Networks (2 questions)			
Demonstrate a working knowledge of hardware used to troubleshoot networks • Link lights • Tone & Probe • Cable Tester • Network analyzers	Comptia 220-901 Exam Objectives: (Networking) Comptia 220-901 Exam Objectives: (Software Troubleshooting)	2.0 4.0	10 14
Demonstrate a working knowledge of hardware used to troubleshoot networks • NS Lookup • arp • tracert/traceroute • IP config/IF config/ • Network Sniffers config • ping • netstat • nbt stat • Loopback	Comptia 220-901 Exam Objectives: (Networking) Comptia 220-901 Exam Objectives: : (Hardware & Network Troubleshooting)	2.0 4.0	10 14
Implement Network Security (3 questions)			
Identify IT system security threats • Social engineering attacks • Hardware attacks • Audit attacks – Port Scans	Comptia 220-902 Exam Objectives: (Security)	3.0	9

Competencies	Name of Resource	Type	Page #
Harden internal IT systems and services • Operating system • DHCP server • Directory services • File and print servers • Firewall	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Other Operating Systems)	1.0 2.0	5 6
Harden internetwork devices and services • Internetwork connection devices • NNTP servers • DNS and BIND servers • Email servers • Web servers • Conferencing and messaging servers • FTP servers	Comptia 220-902 Exam Objectives: (Other Operating Systems) Comptia 220-902 Exam Objectives: (Security)	2.0 3.0	7 9
Implement network communications • Secure network traffic using IPSecc • Secure client Internet access • Secure wireless traffic • Secure the remote access to device	Comptia 220-902 Exam Objectives: (Security)	3.0	9
Manage Public Key Infrastructure (PKI) and certificates • Install a Certificate Authority (CA) hierarchy • Secure network traffic using certificates • Harden a Certificate Authority • Renew certificates • Back up CAs • Revoke certificates • Restore the CA • Back up certificates and private keys • Enroll certificates for entities • Restore certificates and private keys	Comptia 220-902 Exam Objectives: (Security)	3.0	9
Enforce organizational security policies • Develop an organizational security policy • Enforce physical security compliance • Apply an organizational security policy • Educate users • Enforce organizational security policy compliance	Comptia 220-902 Exam Objectives: (Security)	3.0	9
Monitor the security infrastructure • Run vulnerability scans • Set up a honeypot • Monitor for intruders • Respond to security incidents	Comptia 220-902 Exam Objectives: (Security)	3.0	10

Assessment: Business & Information Technology Success Skills Exam

Available: Oklahoma Department of Career & Technology Education, Testing Division

Link to Study Guide: http://www.okcareertech.org/educators/assessments-and-testing/testing/study-guides/StudyGuideList_04102015.pdf

Computer Repair Technician

Directions: The purpose of this crosswalk is to identify where the information technology knowledge and skills for this outcome are currently being taught and addressed. Use the space provided to indicate the specific course where each skill is taught and assessed. Indicate the type of assessment that takes place in the course as follows:

T if Textbook based

O if resource is online (software, website, online course, etc.)

P if resource is project-based

Competencies	Name of Resource	Type	Page #
Demonstrate Proper Procedures and Practices for Safety in the Work Area (2 questions)			
Identify and practice mechanical safety • Tool safety • Hand safety • Eye safety	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Immediately report injuries/accidents following company procedures	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Identify and practice electrical safety	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Participate in Right to Know training and practice environmental safety • Chemical awareness • Environmental regulations • Gases and pressure safety	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Identify and practice safety related to infectious disease, universal precautions, blood-borne pathogens, and chemical hygiene			
Identify and practice thermal safety	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Identify and practice laser safety	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	13
Demonstrate Employability Skills (1 question)			
Maintain a courteous and responsible attitude toward all customers	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Demonstrate appropriate interpersonal skills	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Maintain self-esteem in self and others • Analyze personal space and needs • Cope with changes • Interpret emotional reactions • Interpret sensory clues • Determine values scale and attitudes	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14

Competencies	Name of Resource	Type	Page #
Recognize the importance of teamwork and participate as a team member • Participate in team (group) meetings — Focus on topic and purpose of the meeting — Offer facts and ideas — Help others contribute facts and ideas • Pass on good ideas • Look for ways to help others • Give recognition for things well done • Let others know what you need to get the job done	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Maintain professional respect for supervisor and co-workers	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Use professionalism • Follow facility dress code • Exhibit respect for others • Exhibit positive attitude • Exhibit flexibility • Exhibit initiative • Exhibit commitment • Exhibit loyalty • Practice hygiene	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Use critical thinking skills in workplace situations • Use deductive and inductive reasoning skills • Distinguish appropriateness of equipment and tests • Decision making • Creativity • Use quality performance processes • Use tools to analyze information — Use basic statistical concepts and analysis — Create flow charts — Create charts — Use quality tools — Create histograms • Evaluate stressful situations • Evaluate how to manage ethical conflicts	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Maintain satisfactory attendance • Punctuality • Absence • Early departure • Calling in	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Use stress management techniques	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Function within the organizational structure • Chain of command • Amount of empowerment	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14

Competencies	Name of Resource	Type	Page #
Distinguish the departments within the organization	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Distinguish the roles of the organizational members	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Use self-management and time management techniques • Independence • Delegation • Self-evaluation • Organization • Leadership skills • Prioritization • Supervision • Initiative	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Use proper telephone etiquette • Project positive telephone image • Manage incoming telephone calls — Receive incoming calls — Manage multiple incoming calls — Screen incoming calls — Use telephone log or computerized system — Transfer incoming calls when indicated • Manage telephone calls — Inquiries • Manage telephone calls involving special problems — Unidentified callers — Callers from family and friends — Angry callers • Management telephone calls involving medical emergencies • Record and deliver telephone calls — Local — Conference — Long distance • Use special features if available • Identify factors that relate to a global business environment — Time zones — International dialing codes — Use telephone directories — Evaluate types and organization of each type — Use telephone assistance and information — Maintain company directory	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Employ listening skills • Show interest • Ask questions and clarify what had been heard • Let person know what you understand	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14

Competencies	Name of Resource	Type	Page #
Compose written communication legibly using correct grammar, spelling, and format • Compose requisitions • Compose consent forms • Select and use appropriate format for written communication • Use reference materials — Dictionary — Thesaurus — Software/hardware documentation — Internet Search Resources • Use proper grammar techniques • Abbreviate for words used in addresses, measurements, and months and days of the year & Industry Standard abbreviations • Proper use of commas in: — Sentences listing items in a series — Compound sentences joined by a conjunction — Sentences containing single-word introductory words — Sentences containing appositive — Sentences containing parenthetical expressions — Sentences containing dates and addresses — Greetings and closing of a letter • Sentences containing names followed by abbreviated titles — Choose correct adjective and adverb — Uses correct word(s) — Use correct sentence structure	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Interpret and follow written directions and information	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Identify and Demonstrate Proper Use of Common Tools and Test Equipment (3 questions)			
Demonstrate proper use of hand tools	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Use a digital multimeter to measure • Voltage • Resistance • Current	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Use an AC circuit polarity tester	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate knowledge of cable tester	Comptia 220-901 Exam Objectives: (Networking)	2.0	10

Competencies	Name of Resource	Type	Page #
Identify Common Electronic Components Used in Computers and Networks (2 questions)			
Distinguish between conductors and insulators • Basic materials	Comptia 220-901 Exam Objectives: (Hardware)	1.0	6
Identify and test cells and batteries and demonstrate proper storage and handling procedures	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate proper handling of static-sensitive devices	Comptia 220-901 Exam Objectives: (Hardware)	1.0	6
Identify Fasteners and Terminals Used in Computers and Networks and Demonstrate Proper Installation Procedures			
Identify types of fasteners and terminals	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate use of fasteners and terminals	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Differentiate between types and sizes of screws	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Read and Interpret Diagrams and Blueprints (1 question)			
Identify and use common notations and symbols	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Use diagrams and blueprints to locate and identify specific equipment within areas	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Use diagrams and blueprints to assemble equipment, subassemblies, and peripherals	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Trace signal/power flow	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Network Equipment Diagrams	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate a Basic Understanding of Electronic Theory			
Relate electricity to nature of matter	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Identify sources of electricity	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Apply and relate Ohms Law			
Measure properties of a circuit using a DMM	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Define magnetic properties of circuits and devices			
Identify properties of an AC signal	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Define and apply number systems to codes and arithmetic • Binary number • Hexadecimal number	Comptia 220-901 Exam Objectives: (Networking)	2.0	10

Competencies	Name of Resource	Type	Page #
Evaluate Communications Techniques and Equipment (6 questions)			
Test and troubleshoot specialized analog and digital communications techniques (various pulse modulations, modem, faxes)	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate knowledge of digital communication systems	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate knowledge of fiber optic communication systems	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Demonstrate knowledge of wireless communication systems	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	3.0	10
Demonstrate knowledge of analog communication systems	Comptia 220-901 Exam Objectives: (Hardware)	1.0	6
Install, Evaluate, Troubleshoot, and Upgrade Computers and Peripherals (18 questions)			
Identify subsystems of a computer • Motherboard • Processor • Expansion Slots • Video Card • RAM	Comptia 220-901 Exam Objectives: (Hardware)	1.0	4
	Comptia 220-901 Exam Objectives: : (Hardware & Network Troubleshooting)	4.0	13
Install, troubleshoot, and analyze computer I/O systems • Serial • HDMI • RJ-45 • IDE • Firewire • DVI • BNC • VGA • Parallel • RF • PS2/MINI-DIN • Display Port (DPI) • USB • Wireless Card • Serial ATA • RJ-11 • Various versions of SCSI	Comptia 220-901 Exam Objectives: (Hardware)	1.0	4
	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Demonstrate a working knowledge of hardware used to troubleshoot computer systems	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Demonstrate a working knowledge of software used to troubleshoot computer systems	Comptia 220-902 Exam Objectives: (Software Troubleshooting)	4.0	11
Install and verify proper operation of computer power supplies	Comptia 220-901 Exam Objectives: (Hardware)	1.0	6
Install/upgrade and verify proper operation of computer BIOS Systems/UEFI • CMOS setup memory • Flash Bios	Comptia 220-901 Exam Objectives: (Hardware) Given a scenario, configure settings and use BIOS/UEFI tools on a PC	1.0	4
	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	3.0	10

Competencies	Name of Resource	Type	Page #
Install and verify proper operation of multiple CPU systems	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-901 Exam Objectives: (Hardware & Network Troubleshooting)	1.0 4.0	5 13
Install and verify proper operation of storage devices • SATA • Thumb Drives • Compact Flash • M.2 • ESATA • NVME • SD	Comptia 220-901 Exam Objectives:(Hardware) Comptia 220-901 Exam Objectives: (Hardware & Network Troubleshooting)	1.0 4.0	4 13
Install and verify proper operation of display systems • Single & Multi head displays • Projectors • Touch Displays	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-901 Exam Objectives: (Hardware & Network Troubleshooting)	1.0 4.0	7 13
Install and verify proper operation of input devices • Keyboards • Biometrics • Web Cam • Mouse • Scanners • Mics • Gaming Pads	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-902 Exam Objectives: (Security)	1.0 3.0	7 9
Install and verify proper operation of hard copy output devices • Printers • Plotters	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-901 Exam Objectives: : (Hardware & Network Troubleshooting)	1.0 4.0	7 14
Install and verify proper operation of power conditioning and power back-up devices	Comptia 220-901 Exam Objectives: : (Hardware & Network Troubleshooting)	4.0	13
Research and verify hardware compatibility	Comptia 220-901 Exam Objectives: (Hardware)	1.0	4
Identify, install, and verify proper operating system components • Battery • Hardware • Type I, II, III card • Memory	Comptia 220-901 Exam Objectives: (Hardware) Comptia 220-901 Exam Objectives: : (Hardware & Network Troubleshooting)	1.0 4.0	4 13
Install, Evaluate, Troubleshoot, and Upgrade Networks (1 question)			
Set up and operate computer network systems	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Install and configure network interface controllers	Comptia 220-902 Exam Objectives: (Hardware)	1.0	6
Construct and install cable connectors and interfaces	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Demonstrate a working knowledge of network software	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
Analyze, operate, troubleshoot, and install switches	Comptia 220-901 Exam Objectives: : (Hardware & Network Troubleshooting)	4.0	14

Competencies	Name of Resource	Type	Page #
Understand network design concepts • Types of computing • Topology • Components of a local area network • Protocols • Difference between LAN and WAN • Benefits of networking – Client server – Host-based – Open systems – Peer-to-peer – OSI Model	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Install and configure wireless access points and wireless clients • Security Protocols (WEP,WPA,TKIP, Encryption Key) • SSID • IEEE 802.11 Standards	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Perform Administrative Duties (1 question)			
Prepare typical work orders, logbooks, and historical records	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Research and order parts	Comptia 220-902 Exam Objectives: (Operational Procedures)	5.0	14
Install, Upgrade, and Maintain Operating Systems(Windows, Linux, MAC)(9 questions)			
Install, upgrade, and maintain operating system functions • Advanced functions • File maintenance • Powershell - Bash • Disk maintenance • Script files • Memory optimization • Menus • Hardware compatibility	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technolgy)	2.0	7
Install, upgrade, and maintain user interface functions • Operating system environment • Manipulate GUI	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technolgy)	2.0	7
Install, upgrade, maintain, and interpret utility applications • Recovery/unformat • Correct formatting • Disk drive maintenance • Memory management • Disk optimizing	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technolgy)	2.0	7
Install, maintain, and interpret utility applications • File Systems • Disk drive maintenance • Memory management • Disk optimizing	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technolgy)	2.0	7
	Comptia 220-901 Exam Objectives: (Hardware)	1.0	5

Competencies	Name of Resource	Type	Page #
Perform backup & restore • Importance of backup & restore • Drive imaging • Records management requirements • Differential • Understand media types (disk, tape, cloud, network) • Validating backup • Copy • Sequential • Types of backup strategies/scheduling • Full • Incremental • Off-site storage	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	1.0 2.0	4 6
Install and Maintain Computer Software Applications (5 questions)			
Define purposes of licensing agreements • Site • Multi-user • Stand alone/Single Seat	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	1.0 2.0	4 7
Identify installation requirements • Read and interpret technical manuals • Interaction with other software • Software • Connect hardware • Memory configurations • Base memory • Ports • Upper memory • Peripherals • Monitor • Hard disk requirements	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
Perform custom installations and upgrades • Location of User files • Modify boot files • Location of program files • File system types • Identify proper drivers and peripheral devices • Partition sizes	Comptia 220-902 Exam Objectives: (Windows Operating Systems)	1.0	4
Change default settings • Drive • Peripherals • Directories	Comptia 220-901 Exam Objectives: (Hardware)	1.0	4
Define start-up menu/window • Icons • Script files • Path names • Security • Menu options • Password	Comptia 220-902 Exam Objectives: (Security)	3.0	10
Install, update, and configure malware	Comptia 220-902 Exam Objectives: (Security)	3.0	10

Competencies	Name of Resource	Type	Page #
Using Connectivity to Perform Technical Support			
Describe the general structure of the Internet • Components of the Internet • Compare and contrast online services	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Describe types of services available on the Internet • E-mail • VOIP • File transfer protocol (FTP) • World Wide Web • Video Streaming • VPN • Instant Messaging	Comptia 220-901 Exam Objectives: (Networking)	2.0	10
Define Internet terminology • Simple Messaging Transport Protocol (SMTP) • Internet Service Provider (ISP) • Universal Resource Locator (URL) • DNS • Hyper Text Markup Language (HTML) • DHCP • File Transfer Protocol (FTP) • HTTPS • Hyper Text Transport Protocol (HTTP) • TFTP • VPN • SSL • Transport Control Protocol/Internet Protocol (TCP/IP)	Comptia 220-901 Exam Objectives: (Networking) Comptia 220-902 Exam Objectives: (Security)	2.0 3.0	9 9
Understand how to access the Internet • Install and operate multiple browsers • Internet Service Provider • Online services – Satellite, DSL, Cable, Mobile Hot Spots, and POTS	Comptia 220-902 Exam Objectives: (Hardware) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technologies) Comptia 220-901 Exam Objectives: (Networking) Comptia 220-901 Exam Objectives: (Mobile Devices)	1.0 2.0 2.0 3.0	5 8 10 12
Understand and use basic e-mail concepts • Send and receive e-mail messages • E-mail address conventions • Sending a file attached with an e-mail message • Email reader	Comptia 220-902 Exam Objectives: (Other Operating Systems & Technologies)	2.0	8
Understand and use basic FTP concepts • Connect/disconnect to a FTP site • Retrieve a file using FTP • Browse available files • Send a file using FTP	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Understand and use basic Web site concepts • Web address - URL • Hypertext links • Web page	Comptia 220-901 Exam Objectives: (Networking)	2.0	9

Competencies	Name of Resource	Type	Page #
Understand and use a Web browser • Access multiple Web sites • Move between active Web pages • Add bookmarks	Comptia 220-901 Exam Objectives: (Networking)	2.0	9
Understand how to find information on the Web using search engines • Define how search engines work • Search the World Wide Web • Understand the different search engines available	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Other Operating Systems & Technology)	1.0 2.0	4 7
Demonstrate awareness of safety and security issues of internet use • Virus/Malware • Susceptibility to virus • Firewall/filtering software • Phishing • Security Patches	Comptia 220-902 Exam Objectives: (Windows Operating Systems) Comptia 220-902 Exam Objectives: (Security) Comptia 220-902 Exam Objectives: (Software Troubleshooting)	1.0 3.0 4.0	5 9 11

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Available: Oklahoma Department of Career & Technology Education, Testing Division

Link to Study Guide: http://www.okcareertech.org/educators/assessments-and-testing/testing/study-guides/StudyGuideList_04102015.pdf

Abbreviations, Symbols and Acronyms

The following is a list of abbreviations, symbols, and acronyms used in the Computer Technology study guide and on the Computer Repair Technician and Computer Networking Technician assessments.

+	Plus Sign
%	Percentage Sign
AC	Alternating Current
ARP	Address Resolution Protocol
ATA	Advanced Technology Attachment
BIND	Berkeley Internet Name Domain
BIOS	Basic Input Output System
BNC	Bayonet Neill-Concelman
CA	Certificate Authority
Cat5	Category 5
CD-ROM	Compact Disc Read-Only Memory
CompTIA	Computing Technology Industry Association
CLI	Command-line Interface
CMOS	Complementary Metal-Oxide Semiconductor
CPU	Central Processing Unit
DHCP	Dynamic Host Configuration Protocol
DIMM	Dual In-line Memory Module
DMM	Digital Multimeter
DNS	Domain Name System
DSL	Digital Subscriber Line
DVI	Digital Visual Interface
E SATA	External SATA
EMI	Electromagnetic Interference
ESD	Electrostatic Discharge
FTP	File Transfer Protocol
GB	Gigabyte
GHz	Gigahertz
GPRS	General Packet Radio Services
GUI	Graphical User Interface
HCL	Hardware Compatibility List
HTML	Hypertext Markup Language
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
I/O	Input/output
IDE	Integrated Drive Electronics
IEPs	Individualized Education Plan

IM	Instant Message
IP	Internet Protocol
IPV4	Internet Protocol Version 4
IPV6	Internet Protocol Version 6
IR	Infrared
ISDN	Integrated Services Digital Network
ISP	Internet Service Provider
IT	Information Technology
KB	Kilobyte
Kb	kilobit
LAN	Local Area Network
LAT	Local Area Transport
LDAP	Lightweight Directory Access Protocol
MB	Megabyte
MHz	Megahertz
NDS	Novell Directory Service
NIC	Network Interface Controller
NNTP	Network News Transfer Protocol
NTFS	New Technology File System
NTLDR	NT Loader
NVME	Non Volatile Memory Express
OS	Operating System
OSI	Open Systems Interconnection Model
OTDR	Optical Time-Domain Reflectometer
PC	Personal Computer
PCMCIA	Personal Computer Memory Card International Association
PDA	Personal Digital Assistant
PKI	Public Key Infrastructure
POTS	Plain Old Telephone System
PPP	Peer-to-peer
PPPoE	Peer-to-peer over Ethernet
RAM	Random Access Memory
RIMM	Rambus In-line Memory Module
RJ	Registered Jack
RPO	Recovery Point Objective
RTO	Recovery Time Objective
SAMBA	System for Advanced Mobile Broadband Applications
SAS	Serial attached SCSI

SATA	Serial Advanced Technology Attachment
SC	Subscriber Connector
SCSI	Small Computer System Interface
SD	Secure Digital
SIDs	Security Identifier
SIMM	Single In-line Memory Module
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SO-DIMM	Small Outline Dual In-line Memory Module
SSID	Service Set Identifier
SSL	Secure Sockets Layer
ST	Straight Tip
STP	Shielded Twisted Pair
S-Video	Separate Video
TB	Terabyte
TCP/IP	Transmission Control Protocol/ Internet Protocol
TFTP	Trivial File Transfer Protocol
TKIP	Temporal Key Integrity Protocol
TS	Tip Sleeve
UEFI	Unified Extensible Firmware Interface
UDP	User Datagram Protocol
UPS	Uninterruptable Power Supply
URL	Uniform Resource Locator
USB	Universal Serial Bus
VOIP	Voice Over IP
VDC	Volts Direct Current
VAC	Volts Alternating Current
VPN	Virtual Private Network
WAP	Wireless Application Protocol
WAN	Wide Area Network
WEP	Wired Application Protocol
WPA	Wi-Fi Protected Access

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.



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[illegible]

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