

Computer Networking Fundamentals

General Assessment Information

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Test Type: The Computer Networking Fundamentals assessment is included in NOCTI's Teacher assessment battery. Teacher assessments measure an individual's technical knowledge and skills in a proctored proficiency examination format. These assessments are used in a large number of states as part of the teacher licensing and/or certification process, assessing competency in all aspects of a particular industry. NOCTI Teacher tests typically offer both a written and performance component that must be administered at a NOCTI-approved Area Test Center. Teacher assessments can be delivered in an online or paper/pencil format.

Revision Team: The assessment content is based on input from subject matter experts representing the following states: Georgia, New York, Oklahoma, and Pennsylvania.



11.0901- Computer Systems
Networking and
Telecommunications



Career Cluster
Information Technology



15-1151.00- Computer
User Support Specialists

Written Assessment

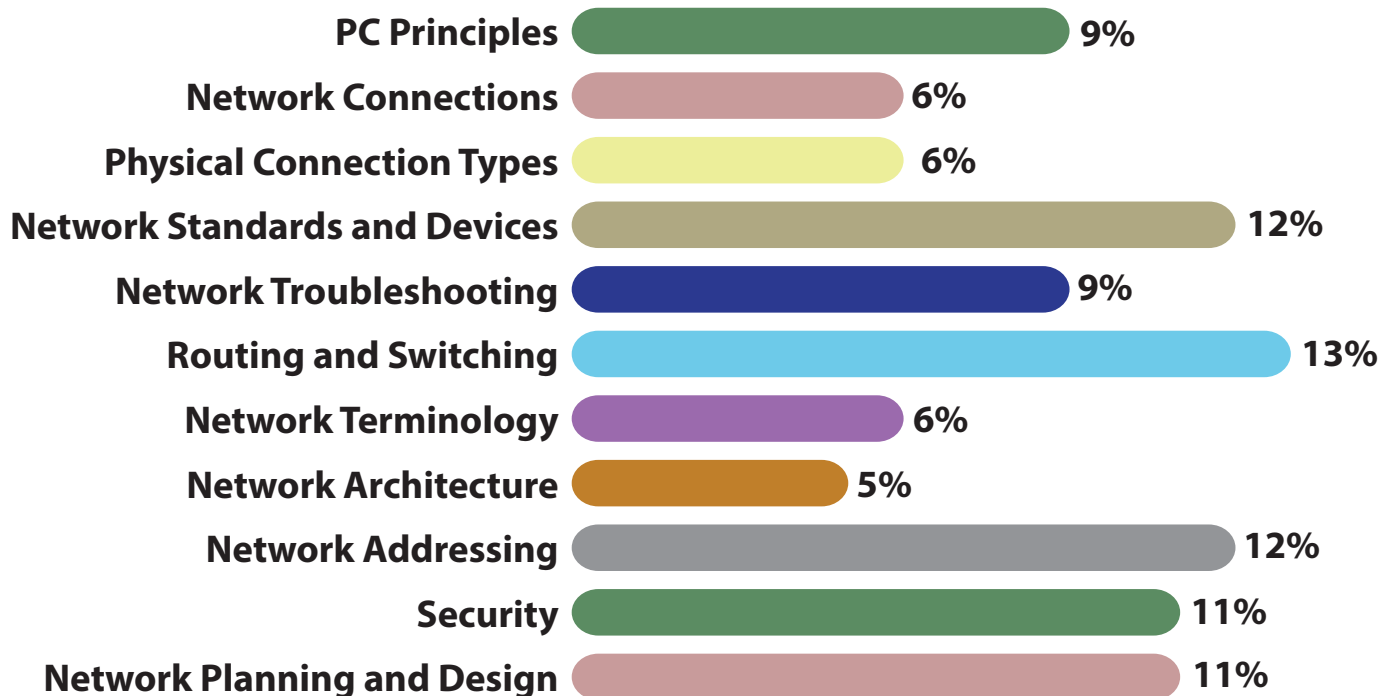
NOCTI written assessments consist of questions to measure an individual's factual theoretical knowledge.

Administration Time: 3 hours

Number of Questions: 189

Number of Sessions: This assessment may be administered in one, two, or three sessions.

Areas Covered



Specific Standards and Competencies Included in this Assessment

PC Principles

- Identify physical and equipment safety and maintenance principles and practices
- Demonstrate understanding of storage methods
- Exhibit understanding of memory
- Demonstrate uses of eSATA, Bluetooth, and USB
- Identify different types and standards of processors
- Develop an understanding of various client operating systems

Network Connections

- Demonstrate understanding of Network Interface Cards (NIC)
- Identify different physical and logical characteristics of network connections
- Demonstrate use of remote access
- Exhibit understanding of all types of wired and wireless communications and standards

Physical Connection Types

- Identify cable components and uses, including twisted pair and fiber
- Demonstrate understanding of signal characteristics and transmission among various media types



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Specific Standards and Competencies (continued)

Network Standards and Devices

- Demonstrate understanding of OSI model layers
- Demonstrate familiarity with TCP/IP model
- Identify IEEE, TIA standards, and common Port numbers
- Distinguish various types and uses of wired network devices
- Distinguish various types and uses of wireless network devices

Network Troubleshooting

- Utilize ping, ipconfig, tracert, and netstat commands
- Maintain and troubleshoot cabling
- Perform local and remote loopback
- Identify various troubleshooting methodologies
- Utilize, perform, and analyze a packet capture

Routing and Switching

- Explain the difference between static, dynamic, default, and gateway routes
- Demonstrate an understanding of WAN connection types
- Recognize and implement basic router operations and configurations
- Demonstrate understanding of switch operations and configurations
- Compare and contrast routed vs. routing protocols
- Differentiate between a collision domain and a broadcast domain

Network Terminology

- Demonstrate familiarity with various protocols and architecture terminology
- Demonstrate familiarity with DHCP and DNS
- Identify various network operating systems
- Identify various network types

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Specific Standards and Competencies (continued)

Network Architecture

- Exhibit understanding of physical and logical networking topologies
- Exhibit understanding of various LAN, MAN, PAN, WLAN, and WAN topologies

Network Addressing

- Exhibit knowledge of IP network addressing
- Differentiate between classful and classless IP addressing
- Demonstrate understanding of Media Access Control (MAC) addressing
- Convert binary, hexadecimal, and decimal numbering systems
- Create subnets from a network address

Security

- Identify and troubleshoot basic organizational/acceptable use policies
- Implement and maintain device security procedures
- Explain the defense in-depth approach to security
- Identify and troubleshoot network security attacks and breaches
- Identify and troubleshoot viruses, worms, and other forms of malware
- Install and maintain appropriate firewalls including NAT
- Explain general cryptography concepts

Network Planning and Design

- Exhibit understanding of analysis and planning concepts
- Compare and contrast principles of logical and physical design
- Identify various forms of power protection, backups, and UPS
- Explain the appropriate use and benefits of thin clients
- Install, maintain, and troubleshoot physical and wireless networks according to design specifications
- Describe various access methods
- Explain the principles of virtualization



Sample Questions

An operating system that supports one user at a time is considered a/an _____ operating system.

- A. client
- B. open source
- C. server
- D. distributed

The best option for maximum throughput in backbone cabling is

- A. fiber-optic cable
- B. shielded twisted pair
- C. coaxial cable
- D. unshielded twisted pair

Performing a loopback test on a router will check the _____ first.

- A. LAN routing tables
- B. total number of packets lost
- C. WAN interface operability
- D. IP address of the LAN interface

The purpose of the Domain Name Service (DNS) is to

- A. supply valid IP addresses as requested by network hosts
- B. centrally manage the mapping of host names to IP addresses
- C. authenticate IP addresses before passing data packets to other network devices
- D. facilitate dynamic addressing

The NIC is installed on

- A. the system board
- B. a port in the modem
- C. the CPU
- D. a CD-ROM drive

Performance Assessment

NOCTI performance assessments allow individuals to demonstrate their acquired skills by completing actual jobs using the tools, materials, machines, and equipment related to the technical area.

Administration Time: 2 hours

Number of Jobs: 2

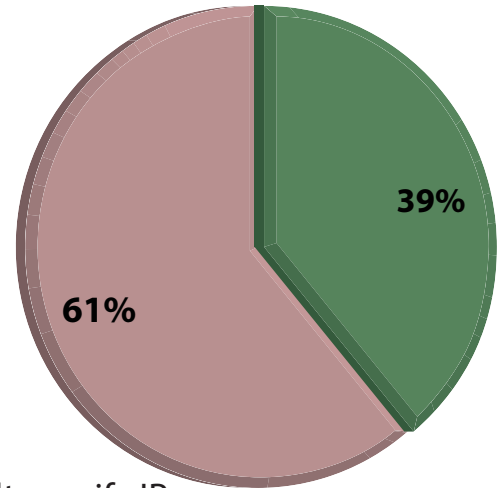
Areas Covered:

39% Select and Connect Equipment to Set Up a Simple LAN with Two Workstations

Participant will select appropriate equipment, assign a private IPv4 Class C address and subnet, record the results, verify IP connectivity, verify that the network was created, and leave the IP connectivity results on screen for evaluator review.

61% Set Up a Workgroup, Create Users, Create Shares and Install a Printer

Participant will name the workstations, make each workstation a member of workgroup named NOCTI, create users, create folders/directories, create a share, grant control permission to folders/directories, attempt to access folders/directories, install plug-and-play printer, make default, share, and print to verify correct set-up/functionality.



Sample Job

Set Up a Workgroup, Create Users, Create Shares and Install a Printer

Maximum Time: 1 hour

Participant Activity: Participant will name the workstations, make each workstation a member of workgroup named NOCTI, create two users, create two folders/directories, create a share, grant full control permission to folders/directories, log in and attempt to access folders/directories, install plug-and-play printer, make default, share to all, print to verify correct set-up/functionality and notify evaluator when finished.

