Test Type: The Computer Networking Fundamentals industry-based credential is included in NOCTI's Job Ready assessment battery. Job Ready assessments measure technical skills at the occupational level and include items which gauge factual and theoretical knowledge. Job Ready assessments typically offer both a written and performance component and can be used at the secondary and post-secondary levels. Job Ready assessments can be delivered in an online or paper/pencil format.

Revision Team: The assessment content is based on input from secondary, post-secondary, and business/industry representatives from the states of California, Georgia, Michigan, Missouri, New Jersey, New York, Oklahoma, and Pennsylvania.
NOCTI written assessments consist of questions to measure an individual’s factual theoretical knowledge.

**Administration Time:** 3 hours  
**Number of Questions:** 186  
**Number of Sessions:** This assessment may be administered in one, two, or three sessions.

### Areas Covered

- **PC Principles:** 10%  
- **Network Connections:** 8%  
- **Physical Connection Types:** 5%  
- **Network Standards and Devices:** 12%  
- **Network Troubleshooting:** 7%  
- **Routing and Switching:** 11%  
- **Network Terminology:** 7%  
- **Network Architecture:** 4%  
- **Network Addressing:** 12%  
- **Security:** 10%  
- **Network Planning and Design:** 14%
Specific Standards and Competencies Included in this Assessment

PC Principles
• Identify physical and equipment safety principles/practices
• Demonstrate understanding of storage methods
• Exhibit understanding of memory
• Demonstrate uses of eSATA, Bluetooth®, and USB
• Identify different types and standards of processors

Network Connections
• Demonstrate understanding of Network Interface Cards (NICs)
• Identify different physical and logical characteristics of network connections
• Demonstrate use of remote access: Windows® terminal services, Telnet, terminal emulation software, VPN, telephony connections, etc.
• Exhibit understanding of all types of wired and wireless communications

Physical Connection Types
• Identify cable components and uses, including twisted pair, coaxial, and fiber
• Demonstrate understanding of signal characteristics and transmission among various media types

Network Standards and Devices
• Demonstrate understanding of OSI model layers
• Demonstrate familiarity with TCP/IP model
• Identify IEEE, EIA/TIA standards and common Port numbers
• Distinguish various types and uses of network devices

(Continued on the following page)
Specific Standards and Competencies (continued)

**Network Troubleshooting**
- Utilize ping, ipconfig, tracert, and netstat commands
- Utilize a CLI (command line interface)
- Maintain and troubleshoot cabling
- Perform local and remote loopback

**Routing and Switching**
- Explain the difference between static, dynamic, default, and gateway routes
- Recognize and implement basic router operations and configurations
- Implement basic 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
- Identify various network operating systems (e.g., Windows®, Linux®)
- Identify various network types

**Network Architecture**
- Exhibit understanding of various network architectures (e.g., access, core, distribution)
- Exhibit understanding of various LAN, MAN, and WAN topologies

**Network Addressing**
- Exhibit knowledge of IP network addressing (e.g., IPv4 and IPv6)
- 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

(Continued on the following page)
Specific Standards and Competencies (continued)

**Security**
- Identify and troubleshoot basic organizational/acceptable use policies
- 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
- Install, maintain, and troubleshoot physical networks according to design specifications
- Describe various access methods (e.g., ISP, DSL, broadband/cable, satellite, wireless, mobile)
- Explain the principle of virtualization
- Configure DHCP and DNS
Sample Questions

What component connects the PC to the network?
A. video card  
B. NIC  
C. CPU  
D. parallel port

A Virtual Private Network (VPN)
A. uses the public Internet to create a private tunnel to connect two computers  
B. is used to create a Personal Wirless Home Network (PWHN)  
C. uses the data link layer of the TCP/IP networking model to connect calls to a landline telephone  
D. is created when a network technician calls for technical support from customer services

Fiber optic cable allows _____ waves to propagate down its length from end to end.
A. light  
B. radio  
C. electrical  
D. sonic

IEEE 802.11 standards specify
A. token ring  
B. wireless networks  
C. FDDI  
D. multicasting

Performing a loopback test on a router can be used to check the
A. total number of packets sent  
B. total number of packets lost  
C. WAN interface operability  
D. IP address of the LAN interface

(Continued on the following page)
Sample Questions (continued)

**Spread-Spectrum technology is used in a _____ network.**
- A. token ring
- B. fiber-optic
- C. wireless
- D. loopback

**EMI has the greatest effect on what type of media?**
- A. fiber optic
- B. unshielded twisted pair
- C. infrared
- D. shielded twisted pair

**Ethernet uses _____ to ensure packet delivery.**
- A. token passing
- B. beaconing
- C. collision detection
- D. broadcasting

**A command line interface can best be described as a/an**
- A. mechanism that allows a mouse to input system commands
- B. user interface that allows greater control through typing of commands
- C. interface that translates binary commands into lines of code
- D. system interface that utilizes buttons and menus to enter commands

**Which routing protocol would be most practical for a basic network with only four routers?**
- A. OSPF
- B. BGP
- C. RIP
- D. IPX
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**  
Participants will select the appropriate equipment, create a simple LAN with two workstations, configure IP addresses, record information at both workstations, verify IP connectivity, and leave IP connectivity results on the screen for review.

61%  **Set Up a Workgroup, Create Users, Create Shares, and Install a Printer**  
Participants will name the two workstations, set up a workgroup named NOCTI, create User1 and User2 on both WS1 and WS2, create and share private and public folders/directories, grant permissions on private folder/directory for User1 on WS1, create a share for the public folder/directory, on WS1 grant permissions on the public folder/directory for everyone, verify User1 access to public folder, verify User2 denied access to private folder, on WS1 install and name printer, and assign User2 printing rights to the printer on WS1.
Sample Job

Select and Connect Equipment to Set up a Simple LAN with Two Workstations

Maximum Time: 1 hour

Participant Activity: The participant will select the appropriate equipment and use it to create a simple LAN with two workstations and a switch or hub, assign a private Class C address and subnet mask to the two workstations, record the results for both workstations, verify IP connectivity from each using a command line, verify the network is correctly set up according to specifications, and leave results for the evaluator.