Network Technology  

**CMP-354-TE**

*This TECEP® tests knowledge of the fundamental concepts of data communications. Topics covered include: network architectures, topologies, media and devices, protocols, types of servers, cloud computing, mobility, performance, and security. (3 s.h.)*

- Test format: 70 multiple choice questions (1 point each); 3 essays (10 points each)
- Passing score: 70% (70/100 points). Your grade will be reported as CR (credit) or NC (no credit).
- Time limit: 2 hours

### Topics on the test and their approximate distribution

1. **Network Concepts (15%)**
   - 1.1 Network components
   - 1.2 Network device roles
   - 1.3 Network models and software
   - 1.4 LAN, MAN, WAN
   - 1.5 Internet, intranet, extranet
   - 1.6 Future trends of networking
   - 1.7 Standards organizations
   - 1.8 OSI model

2. **Protocols (15%)**
   - 2.1 Fiber and copper media
   - 2.2 Data link and network layer protocols
   - 2.3 IEEE 802 standard
   - 2.4 Network protocols
   - 2.5 IP addresses
   - 2.6 Host name resolution
   - 2.7 TCP/IP utilities

3. **Network Infrastructure (15%)**
   - 3.1 Network topologies
   - 3.2 Physical and logical networks
   - 3.3 Wireless network modes
   - 3.4 Remote access and authentication
   - 3.5 WAN connectivity techniques

4. **Mobility (15%)**
   - 4.1 Mobile computing
   - 4.2 Mobile data communications (GSM, CDMA, LTE)
   - 4.3 Hotspots
   - 4.4 WLAN
   - 4.5 Wi-Fi

5. **Communication Services (10%)**
   - 5.1 Types of servers
   - 5.2 Peer-to-peer and client servers
   - 5.3 Directory services
   - 5.4 Network services
   - 5.5 Network operating systems
6. Cloud Computing  (15%)
   6.1 Public Cloud
   6.2 Private Cloud
   6.3 Hybrid Cloud
   6.4 Types of Services (IaaS, PaaS, SaaS)
   6.5 Virtualization
   6.6 Grid Computing

6. Monitoring And Protecting The Network  (15%)
   7.1 Network reliability
   7.2 Fault tolerance and redundancy
   7.3 Network performance
   7.4 Cyber security
   7.5 Network attacks and malicious software
   7.6 Firewalls, antivirus software, data encryption

Outcomes assessed on the test

- Describe the different types of networks and architectures.
- Explain the need for standards organizations and network models.
- Assess the characteristics of a physical and logical topology.
- Identify the functionality of various types of network media and devices.
- Discuss the role of low and high level data communication protocols.
- Evaluate the functions of various types of network servers and services.
- Apply the common types of management techniques and tools to monitor and troubleshoot the network.
- Analyze the concepts needed for cyber security and where it should be applied to minimize exposure on a network.
- Describe various types of mobility and cellular technologies and their uses.
- Illustrate the similarities and differences among public, private and hybrid cloud service models.

Study materials

Many college-level texts and free online resources in this subject can help you prepare. The important thing is to make sure you are knowledgeable about the information by comparing your study materials to the topic outline, to make sure everything is covered. The links below were live when this test description was posted. Please email otdr@tesc.edu if you find a broken link.


TCP / IP - An animated discussion
http://www.youtube.com/watch?v=RbY8Hb6abbg&feature=related

The History of Ethernet
http://www.youtube.com/watch?v=g5MezxMcRmk

Network Equipment Basics
http://www.youtube.com/watch?v=72HBsT1FaAY&feature=related
Warriors of The .Net  
https://www.youtube.com/watch?v=PBWhzz_Gn10

Introduction To Wireless Networking  
http://www.youtube.com/watch?v=xS_brBAYSKE&NR=1

Mysteries of the Internet  
http://www.youtube.com/watch?v=qv0XCaUkfNk

The OSI Model - CompTIA Network+  
https://www.youtube.com/watch?v=W438koUR04o

Internet Infrastructure Overview  
https://www.youtube.com/watch?v=495883wD_yQ

Topologies  
https://www.youtube.com/watch?v=ihb_qa6qTbE

Online Safety: Firewalls  
https://www.youtube.com/watch?v=pYxr8mG86PA&feature=gv&hl=en

Cloud Computing: What is Cloud Computing?  
https://www.youtube.com/watch?v=uYGQcmZUTaw

What is Virtualization?  
https://www.youtube.com/watch?v=V9AiN7oJaIM

Wireless Telecommunications Course: Cellular to LTE, WiFi and Satellite  
https://www.youtube.com/watch?v=txGY4j4j7iw

3G vs. 4G Wireless - What is the Difference?  
https://www.youtube.com/watch?v=mv9z_L3RQp4

**Sample questions**

1. Which of the following is NOT a characteristic of a WAN?  
   a. They usually communicate at high speeds.  
   b. They can cover a very large geographic area.  
   c. They can be used to interconnect two or more MANs.  
   d. Access is limited.

2. __________ is an IEEE wireless networking standard.  
   a. 802.2  
   b. 802.3  
   c. 802.5  
   d. 802.11
3. Which of the following is the bottom layer of the OSI model?
   a. Application
   b. Physical
   c. Data link
   d. Session

4. A __________ is basically a simple amplifier.
   a. repeater
   b. bridge
   c. brouter
   d. switch

5. What Wi-Fi standard uses up to 54 Mbps in the 2.4 Ghz band?
   a. 802.11a
   b. 802.11b
   c. 802.11g
   d. 802.11n

6. Which of the following uses existing copper telephone lines to carry digital signals?
   a. Ethernet
   b. Token-ring
   c. DSL
   d. SONET

7. FDDI uses __________ technology.
   a. coaxial cable
   b. fiber optic
   c. twisted-pair cable
   d. wireless

8. Which of the following is technically a multiport repeater for use with twisted-pair cable?
   a. NICs
   b. Bridges
   c. Hubs
   d. Routers

9. The __________, also called the digital signaling technique, indicates how information is represented as voltage levels or electrical current charges.
   a. bipolar signaling
   b. encoding method
   c. double current signaling
   d. data rate
10. Each host is assigned a unique 16-bit number in which of the following ranges?
   a. 0-255
   b. 0-6,535
   c. 0-65,535
   d. Infinite range

11. ___________ is a protocol and application that provides remote terminal emulation services in clear text.
   a. FTP
   b. UDP
   c. TFTP
   d. Telnet

12. Client/server networks are more secure than
   a. firewalls
   b. peer-to-peer networks
   c. multiserver networks
   d. member servers

13. ___________ can have a serious adverse effect on a company’s finances.
   a. Trap commands
   b. Bottlenecks
   c. Firefighting
   d. Network downtime

14. A normal backup is also referred to as a(n)
   a. daily backup
   b. full backup
   c. differential backup
   d. incremental backup

15. Wireshark is an example of a
   a. network protocol analyzer program
   b. remote management application
   c. security vulnerability management system
   d. configuration management tool

16. Unauthorized access is related to
   a. confidentiality and availability
   b. confidentiality and integrity
   c. availability and integrity
   d. availability and reliability
17. ___________ is the process of decoding encrypted data.
   a. Transcription
   b. Elucidation
   c. Simplification
   d. Decryption

Sample Essay: Answers should be about 1 to 3 paragraphs long.

18. Describe the differences between IP version 4 (IPv4) and IP version 6 (IPv6), and explain how IPv6 corrects problems encountered by IPv4.

Answers to sample questions

1.  a  2.  d  3.  b  4.  a  5.  c
6.  c  7.  b  8.  c  9.  b  10. c
11. d  12. b  13. d  14. b  15. a
16. b  17. d

18. Essay questions are worth 10 points each and will be scored on the following basis.

   4 points – Answer addresses all of the requirements specified in the essay
   3 points – Answer provides technically accurate details
   2 points – Answer provides a complete analysis/rationale
   1 point – Answer is clearly expressed

10 points