

# NETWORK TECHNOLOGY CMP-354

This TECEP® exam focuses on 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% (70/100points). Your grade will be reported as CR (credit) or NC (no credit).
- Time limit: 2 hours

## Topics on the test and their approximate distribution

Below are the topics covered by this exam. The percentages indicate how much of the test is made up of questions on that topic.

### 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

## 7. 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 resources

Many college-level texts and free online resources in this subject, such as those listed below, 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.

Patrick Ciccarelli et al. *Networking Basics*. Current edition. Hoboken, NJ: John Wiley & Sons.

[TCP / IP - An animated discussion](#)

[The History of Ethernet](#)

[Warriors of The .Net](#)

[Mysteries of the Internet](#)

[The OSI Model - CompTIA Network+](#)

[Internet Infrastructure Overview](#)

[Topologies](#)

[Online Safety: Firewalls](#)

[Cloud Computing: What is Cloud Computing?](#)

[What is Virtualization?](#)

[Wireless Telecommunications Course: Cellular to LTE, WiFi and Satellite](#)

[3G vs. 4G Wireless - What is the Difference?](#)

## Sample questions

### Multiple-Choice

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

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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. router
    - 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

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10. Each host is assigned a unique 16-bit number in which of the following ranges?
- 0-255
  - 0-6,535
  - 0-65,535
  - Infinite range
11. \_\_\_\_\_ is a protocol and application that provides remote terminal emulation services in clear text.
- FTP
  - UDP
  - TFTP
  - Telnet
12. Client/server networks are more secure than
- firewalls
  - peer-to-peer networks
  - multiserver networks
  - member servers
13. \_\_\_\_\_ can have a serious adverse effect on a company's finances.
- Trap commands
  - Bottlenecks
  - Firefighting
  - Network downtime
14. A normal backup is also referred to as a(n)
- daily backup
  - full backup
  - differential backup
  - incremental backup
15. Wireshark is an example of a
- network protocol analyzer program
  - remote management application
  - security vulnerability management system
  - configuration management tool
16. Unauthorized access is related to
- confidentiality and availability
  - confidentiality and integrity
  - availability and integrity
  - 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