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## NETWORK DESIGN

### Overview

The ability to evaluate the needs of an organization and then design and implement network solutions is a valuable skill in today's connected workplace. This event provides recognition for FBLA members who demonstrate an understanding of and ability to apply these skills.

This is a team event composed of two or three members. This event consists of two parts: an objective test and a performance. The objective test is taken collaboratively by the team members and the top fifteen teams scoring the highest on the objective test will advance to the final round and participate in the performance component.

### Competencies and Task Lists

<http://www.fbla-pbl.org/docs/ct/FBLA/NETWORKDESIGN.pdf>

### Website Resources

- Network Design for Homes and Businesses  
[http://compnetworking.about.com/od/networkdesign/Network\\_Design.htm](http://compnetworking.about.com/od/networkdesign/Network_Design.htm)
- Network Design Manual  
<http://www.networkcomputing.com/netdesign/series.htm>
- Network Management Definitions  
<http://whatis.techtarget.com/glossary/network-management-category-.html>

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## NETWORK DESIGN SAMPLE QUESTIONS

1. In which phase of network design does the network analyst interview users and technical personnel to gain an understanding of the business and technical goals?
  - a. physical design
  - b. test, optimize, and document the design
  - c. analyze requirements
  - d. logical design

**Competency:** Network Installation - Planning and Configuration

2. Which phase of network design deals with network layer addressing and switching and routing protocols?
  - a. test, optimize, and document the design
  - b. analyze requirements
  - c. logical design
  - d. physical design

**Competency:** Network Installation - Planning and Configuration

3. Which phase of network design involves investigation of service providers?
  - a. test, optimize, and document the design
  - b. analyze requirements
  - c. physical design
  - d. logical design

**Competency:** Network Installation - Planning and Configuration

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4. Which phase of network design involves building a prototype?
- a. physical design
  - b. logical design
  - c. analyze requirements
  - d. test, optimize, and document the design

**Competency:** Network Installation - Planning and Configuration

5. What is the name given to the reflective material surrounding the glass or plastic core of a fiber optic cable?
- a. kevlar
  - b. cladding
  - c. sheath
  - d. buffer

**Competency:** Network Installation - Planning and Configuration

6. Which type wiring runs between floors in a multi-floor structure?
- a. patch
  - b. horizontal
  - c. vertical
  - d. cross-connect

**Competency:** Network Installation - Planning and Configuration

7. Which type of wiring runs from telecommunications closets to wall plates in offices?
- a. cross-connect
  - b. horizontal
  - c. patch
  - d. vertical

**Competency:** Network Installation - Planning and Configuration

8. Considering the OSI model, which one of the following would be associated with the Segment as a request for a web page leaves the source PC?
- a. fe80::219:b9ff:fe20:33cf
  - b. 192.168.23.1
  - c. 00-19-B9-20-33-CF
  - d. 3877

**Competency:** Problem Solving/Troubleshooting

9. Which one of the following is a low-level operating system commonly used for testing and troubleshooting on a Cisco router?
- a. ROMMON
  - b. BIOS
  - c. bootstrap
  - d. POST

**Competency:** Problem Solving/Troubleshooting

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10. Which UNIX command will display the IP address and other configuration information about your host's connection to the network?

- a. ifconfig
- b. finger
- c. echo ip
- d. ipconfig

**Competency:** Problem Solving/Troubleshooting

11. Which Windows utility allows a user to query the configured name server to resolve a given host name?

- a. nbtstat
- b. netstat
- c. ipconfig
- d. nslookup

**Competency:** Problem Solving/Troubleshooting

12. What Windows command will display the contents of the locally cached DNS entries?

- a. ipconfig -dns
- b. ifconfig
- c. ipconfig /all
- d. ipconfig /displaydns

**Competency:** Problem Solving/Troubleshooting

13. Which one of the following is the result of attaching the name of a host to a domain name with a period in between them?

- a. socket address
- b. resource index
- c. fully qualified domain name
- d. A-type record

**Competency:** Network Administrator Functions

14. Which one of the following is **not** a component of the Network Security Wheel used for security policy compliance?

- a. test
- b. secure
- c. monitor
- d. budget

**Competency:** Network Administrator Functions

15. Which one of the following terms describes reducing the size of a file?

- a. file decompression
- b. file indexing
- c. file encryption
- d. file compression

**Competency:** Network Administrator Functions

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16. Which one of the following practices creates a starting point for ongoing evaluation of your network's health?
- a. asset management
  - b. fault management
  - c. base lining
  - d. change management

**Competency:** Network Administrator Functions

17. Which one of the following practices describes recording the operating system version which is installed on all switches and routers on your network?
- a. configuration management
  - b. asset management
  - c. systems management
  - d. change management

**Competency:** Network Administrator Functions

18. Which one of the following is **not** a private IP address?
- a. 172.31.40.23
  - b. 192.168.40.23
  - c. 10.0.40.23
  - d. 172.32.40.23

**Competency:** Network Administrator Functions

19. Which NAT addressing term is used to refer to a host on the local network?
- a. inside local
  - b. inside global
  - c. outside global
  - d. outside local

**Competency:** Configuration of Internet Resources

20. Which term describes the security policy that permits access through all ports **except** those explicitly denied?
- a. permissive
  - b. restrictive
  - c. authorized
  - d. open

**Competency:** Configuration of Internet Resources

21. Which protocol allows P2P applications to search for shared resources on peers across the Internet?
- a. FindMe
  - b. Gnutella
  - c. Pickles
  - d. Xterra

**Competency:** Configuration of Internet Resources

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22. Which term is used to describe fiber optic cable that is **not** in use or has **not** been terminated?

- a. white fiber
- b. dark fiber
- c. free fiber
- d. open fiber

**Competency:** Configuration of Internet Resources

23. Which subnet mask is used to identify the range of class B private IP addresses?

- a. 255.255.0.0
- b. 255.240.0.0
- c. 255.0.0.0
- d. 255.255.255.0

**Competency:** Configuration of Internet Resources

24. Which one of the following statements best describes the backup process?

- a. copying data to media that is stored on the same device
- b. copying data to media that is not stored on the device
- c. moving data to media that is not stored on the same device
- d. moving data to media that is stored on the same device

**Competency:** Backup and Disaster Recovery

25. Which type backup process archives all selected files that have changed since the last full or incremental backup and does **not** reset the archive bit?

- a. full
- b. incremental
- c. differential
- d. copy

**Competency:** Backup and Disaster Recovery

26. Which one of the following terms describes a specialized storage device or group of storage devices that provides a centralized fault-tolerant data storage for a network?

- a. Fiber-Channel Storage
- b. Storage Area Networks
- c. Local Attached Storage
- d. Network Attached Storage

**Competency:** Backup and Disaster Recovery

27. Which one of the following describes data storage redundancy through a process involving writing data across multiple disks and using an error correction code (parity) stored on a single disk?

- a. RAID level 1
- b. RAID level 3
- c. RAID level 5
- d. RAID level 2

**Competency:** Backup and Disaster Recovery

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28. Which type backup process archives all selected files and folders and resets the archive bit?
- a. differential
  - b. copy
  - c. full or normal
  - d. incremental

**Competency:** Backup and Disaster Recovery

29. Which one of the following is **not** a step in the DHCP messaging process?
- a. DHCP offer
  - b. DHCP request
  - c. DHCP decline
  - d. DHCP discover

**Competency:** Configuration Network Resources & Services

30. The DHCP request message is sent as a broadcast. What is the purpose of it being a broadcast rather than a unicast?
- a. to let all DHCP servers know which IP address is being accepted by the client
  - b. to let all DHCP servers and all other DHCP clients know which IP address is being accepted by the client
  - c. because the address of the DHCP server is unknown
  - d. to let all DHCP clients know which IP address is being accepted

**Competency:** Configuration Network Resources & Services

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## NETWORK DESIGN SAMPLE CASE STUDY

### PARTICIPANT INSTRUCTIONS

1. You have twenty minutes to review the case.
2. Presentation time is seven minutes. At six minutes the timekeeper will stand and hold up a colored card indicating one minute is left and at seven minutes the timekeeper will stand and hold up a colored card indicating time is up. Five points are deducted if presentation goes over seven minutes.
3. The judges will have a three-minute question and answer period following the presentation.
4. Each team member will be given two note cards. A flip chart also will be available.
5. All members of the team must participate in the presentation, as well as answer the questions.

### PERFORMANCE INDICATORS

- Select and present logical solution with positive and negative aspects of its implementation given
- Recognized alternatives with pros and cons stated and evaluated
- Well organized and clearly stated thoughts and statements; appropriate business language is used
- Demonstrate ability to effectively answer questions

### CASE STUDY SITUATION

You have been hired by Roman Motor Company to design and implement a networking solution for their main office and for two satellite offices in different parts of town. Their main office is located approximately 10 miles from each of the satellite offices in opposite directions. The main office is provided with Internet access from the local telephone company in the form of a shared T1 line. Roman Motor Company plans to add at least one new satellite office within the next five years, providing that the business continues to grow as forecasted. At present, employees at the satellite offices have their own computer and networking systems that are completely separate from the main office, and manually take their backups to the main office, which is becoming very cumbersome. You must determine the best way to connect the satellite offices back to the main office. Upon initial planning, the following network requirements have been identified:

- Purchase and setup the proper networking equipment (including an IP addressing solution) within each satellite office in order for a secure, highly-available connection back to the main office. The inventory and sales systems in place in the satellite locations are consistent with the main office.
- Provide kiosks in the satellite locations where customers can have Internet access to look up CARFAX® information and do price comparisons with other car dealers in the area. These kiosk machines should not be able to access any of the other network resources in the offices, but should have the ability to print out information.

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- Provide for additional capacity as the new satellite office is brought 'online'
  - Provide for centralized printing for invoicing and financial documentation for sales
  - Provide for limited downtime
  - Provide for centralized management and control of the computers in the two offices, as well as those in the main office, so that you can maintain the network from off-site
  - Provide for long-term cost effectiveness
  - Provide a suite of software tools for the employees to effectively communicate with each other at all locations

The company does **not** have any networking equipment at the satellite locations, but does have one computer at each of the satellite offices where the sales personnel can access the same sales software that is used at the main office, although it is not tied to the main office. Your plan should include a complete network system that meets these requirements and allows for future expansion plans.

One of the satellite locations is located within a suburban area that has current technological infrastructures and related technology offerings. The other location currently does **not** have access to the phone company network or the local cable company broadband network.

Complete your proposal including costs for computing equipment for the kiosks, network infrastructure, network servers, printers, and related hardware, software, and accessories. Include as much detail as possible as well as justification as to your selections. Diagram and explain your physical network and computer design as well as the logical network design (server installation, domain layout, etc.). As you are working for a small business, cost is a major factor and should be minimized.



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**Management Information Systems Answer Key**

1) B	11) D	21) A
2) C	12) D	22) B
3) A	13) A	23) D
4) A	14) A	24) D
5) D	15) A	25) C
6) D	16) C	26) B
7) B	17) D	27) C
8) B	18) A	28) D
9) B	19) C	29) C
10) A	20) A	30) C

**Marketing Answer Key**

1) B	11) A	21) B
2) C	12) A	22) C
3) C	13) C	23) B
4) A	14) B	24) A
5) C	15) B	25) B
6) A	16) B	26) B
7) C	17) B	27) A
8) B	18) C	28) A
9) D	19) C	29) C
10) B	20) D	30) B

**Network Design Answer Key**

1) C	11) D	21) B
2) C	12) D	22) B
3) C	13) C	23) B
4) D	14) D	24) B
5) B	15) D	25) C
6) C	16) C	26) D
7) B	17) A	27) B
8) D	18) D	28) C
9) A	19) A	29) C
10) A	20) A	30) A

**Networking Concepts Answer Key**

1) C	11) D	21) D
2) A	12) B	22) C
3) B	13) C	23) A
4) D	14) C	24) A
5) C	15) A	25) D
6) D	16) C	26) B
7) D	17) B	27) A
8) C	18) C	28) A
9) A	19) D	29) B
10) B	20) C	30) C