Tennessee CTE

Cabling & Internetworking

Cabling Overview

1 Research the history and development of communications cabling to acquire knowledge of present-day network cabling concepts and uses, including but not limited to: 1

- a The history of telephone and wireless communications in the United States 1.A
- b The differences between analog and digital communication systems 1.B
- c The three main types and typical applications of twisted-pair cabling 1.C
- d Proper uses of plenum- and riser-rated cabling 1.D

Safety

2 Assess a variety of situations requiring the use of network cabling and demonstrate the ability to follow procedures safely. Explain the applicability of various safety standards and procedures, including but not limited to: 2

- a Safety codes and standards for the cabling materials and installation methods 2.A
- b Safe practices working around electricity 2.B
- c Workplace safety practices 2.C
- d Personal safety equipment 2.D

Computers and Electronics

3 Compare and contrast aspects of communication signals carried by various types of cabling, identifying which types are best suited for different applications. Complete a graphic organizer to differentiate characteristics of: 3

- a Analog signals versus digital signals 3.A
- b Voltage signals versus optical signals 3.B
- c Multiplexed signals 3.C

Transmission Media

4 Compare and contrast the typical applications for various types of data cables (such as twisted pair, coaxial cable, fiber optic), and the conditions under which a technician may use them. Defend the choice of cable for an example application, coherently and respectfully expressing the rationale behind the choice to a mock customer. 4

5 **Compare and contrast conducting data cables with fiber-optic data cables, including but not limited to:** 5

- a Transmission modes (electrical conduction versus optical transmission) 5.A
- b Connectors 5.B
- c Installation issues 5.C
- d Advantages and disadvantages 5.D

Specifications and Standards

6 **Research wiring standards and the organizations responsible for drafting and overseeing them. During a practice installation, explain how the communication of the standards impacts a user's ability to specify, install, and test the appropriate cabling. The subject organizations should include:** 6

- a American National Standards Institute (ANSI) 6.A
- b Telecommunications Industry Association (TIA) 6.B
- c Electronics Industries Alliance (EIA) 6.C

7 **During a practice installation of data cabling, describe the applicability of the National Electrical Code (NEC) and Underwriters Laboratories (UL) requirements, citing specific textual evidence.** 7

Cabling System Design

8 **Design a telecommunications closet (TC) for a Local Area Network (LAN) installation. Craft a full explanatory text that cites specific textual evidence in descriptions of:** 8

- a Differences between TC and equipment rooms 8.A
- b Recommended number of TCs in a large building 8.B
- c TC construction standards (including required and prohibited features and dimensions) 8.C
- d Typical equipment and features in TC 8.D
- e Required environmental conditions inside the TC 8.E

9 **Explain and demonstrate, in writing or a presentation, the role played by each component in a typical star network installation, including the Network Interface card (NIC), media converter, repeater, hub, bridge, switch, server, and router. For each component, detail the likely consequences in the event of failure, and prescribe strategies for prevention and maintenance.** 9

Cabling Installations

10 **Plan and implement a small-scale LAN installation, properly using the tools, techniques, and materials accepted in cabling industry, including but not limited to building schematics, wire cutters and wire strippers, cable crimpers, punch-down tool, "fish tape" and pull/pushrods, diagnostic test tools, lubricants, and cable identification tags. Before completing installation, design a summary document that includes a narrative of activities and a graphic illustration of sites to share with potential customer.** 10

	11	**As part of a real or practice installation, explain and demonstrate the rough-in phase for both horizontal and vertical installations of data cabling in a small office, including but not limited to horizontal and vertical installations, fire stops, and telecommunications closet construction or upgrades.** 11
	12	**As part of a real or practice installation, explain and demonstrate the trim-out phase of an installation, including but not limited to cable management, connectors and splices for copper media and fiber-optic media, and patch panels.** 12
	13	**As part of a real or practice installation, explain and demonstrate the completion stage of an installation, including but not limited to cable testing and certification, performance testing, final dressing of the installation, and documentation and drawings representing the finished installation and test results.** 13
Special Cabling Situations	14	**Demonstrate an understanding of the special cabling situations required for high bandwidth scenarios, providing power over Ethernet (PoE), standards of SCADA systems, industrialgrade data cabling requirements, and preventive maintenance programs for cable systems. Create and deliver a brief presentation on at least one of the above topics, citing specific textual evidence.** 14