Tennessee CTE

Computer Systems

Safety

1 **Accurately read, interpret, and demonstrate adherence to safety rules, including rules published by the (1) National Science Teachers Association (NSTA), (2) rules pertaining to electrical safety, (3) Internet safety, (4) Occupational Safety and Health Administration (OSHA) guidelines, and (5) state and national code requirements. Be able to distinguish between rules and explain why certain rules apply.** 1

2 **Identify and explain the intended use of safety equipment available in the classroom. For example, demonstrate how to properly inspect, use, and maintain safe operating procedures with tools and equipment.** 2

Career Exploration

3 **Explore the types of technical certifications recognized in the information technology (IT) industry. Write a brief paper that distinguishes between vendor neutral and vendor specific certifications, providing examples of each. Explain why earning technical certification is advantageous to IT professionals. Cite evidence from technical literature and industry standards to support claims.** 3

4 **Locate and access the Computer Technology Industry Association (CompTIA) website and analyze its structure, policies, and requirements for CompTIA A+ certification. Identify what steps are required to obtain the certification, and explain how to prepare for the examination.** 4

Hardware

5 **Research the following storage devices and backup media. Create a table or other graphic organizer that lists examples of each device and details their purpose, characteristics, and proper maintenance. Demonstrate proper installation and configuration of each device while using the appropriate media.** 5

- a Optical drives 5.A
- b Combo drives and burners 5.B
- c Connection types 5.C
- d Hard drives 5.D
- e Solid state / flash drives 5.E
- f RAID types 5.F
- g Floppy drive 5.G
- h Tape drive 5.H
- Media capacity 5.I

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6 **Identify and explain the following motherboard components. Citing specific examples, write a brief paper differentiating between the components and describing the purpose, properties, and characteristics of each.** 6

- a Expansion slots 6.A
- b RAM slots 6.B
- c CPU sockets 6.C
- d Chipsets 6.D
- e Jumpers 6.E
- f Power connections and types 6.F
- g Fan connectors 6.G
- h Front panel connectors 6.H
- i Bus speeds 6.I

7 **Given an assignment with defined hardware specifications, identify the appropriate power supply. Noting the following technical components, write a text explaining the various types of power supply that were considered. Citing specific evidence, explain the characteristics of each and how the final selection was determined. Install the appropriate power supply.** 7

- a Connector types and their voltages 7.A
- b Specifications (e.g., wattage, size, number of connectors, etc.) 7.B
- c Dual voltage options 7.C

8 **Explore various types of central processing units (CPU). Describe the following characteristics of the CPU types. Identify appropriate cooling methods (e.g., heat sink, fans, thermal paste, liquidbased) for each type discussed and justify the selection with supporting evidence.** 8

- a Speeds 8.A
- b Cores 8.B
- c Cache size/type 8.C
- d Hyperthreading 8.D
- e Virtualization support 8.E
- f Architecture (32-bit vs 64-bit) 8.F
- g Integrated GPU 8.G

9 **Investigate the following memory types. Create a table or other graphic organizer that describes, compares, and contrasts each type. Explain the memory compatibility and speed, as well as the appropriate application of each memory type. Cite evidence supporting each application prescribed.** 9

- DDR 9.A
- DDR2 9.B

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c DDR3 9.C

d SDRAM 9.D

e SODIMM 9.E

f RAMBUS 9.F

g DIMM 9.G

h Parity vs. non-parity 9.H

i ECC vs. non ECC 9.I

j RAM configurations 9.J

k Single sided vs. double sided 9.K

Operating Systems

10 Research the features and requirements of Microsoft operating systems. Write a brief paper that compares and contrasts the operating systems. Drawing on multiple resources, explain why it is important to know this information when installing and configuring an operating system. 10

11 Identify and explain various alternatives to install and configure an operating system. For a given assignment, install and configure an operating system by selecting the most appropriate method. Upon completion of the work, write an explanation and justify the actions by citing supporting evidence from technical manuals and industry standards. The explanation should include, but is not limited to, information on the following: 11

a Boot methods (e.g., USB, CD-ROM, DVD, PXE) 11.A

b Type of installations (e.g., creating image, unattended installation, upgrade, multiboot, etc.) 11.B

c Partitioning (e.g., dynamic, basic, primary, extended, logical) 11.C

d File system types/formatting (e.g., FAT, FAT32, NTFS, CDFS, quick format vs. full format) 11.D

e Loading alternate third party drivers 11.E

f Workgroup vs. Domain group 11.F

g Driver installation 11.G

h Factory recovery partition 11.H

12 Demonstrate an understanding of how to apply the following command line tools to identify problems with networking and operating systems. For a given assignment, follow the multistep process to execute an appropriate command and justify why it was selected to perform a specific action. 12

a Networking (e.g., PING, TRACERT, NETSTAT, IPCONFIG, NET, NSLOOKUP, NBTSTAT) 12.A

b Operating system (e.g., TASKKILL, BOOTREC, SHUTDOWN, TASKLIST, MD, RD, CD, DEL, FORMAT, COPY, XCOPY, ROBOCOPY, DISKPART, SFC, CHKDSK) 12.B

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13 **Demonstrate the proper selection and use of the following operating system features and tools. For a given assignment, explain the selection of the tools and the results.** 13

- a Administrative (e.g., local security policy, Windows firewall, performance monitor, etc.) 13.A
- b MSCONFIG (e.g., general, boot, services, startup, and tools) 13.B
- c Task Manager (e.g., applications, processes, performance, networking, users) 13.C
- d Disk management (e.g., drive status, mounting, extending partitions, splitting, adding drives, adding arrays, etc.) 13.D
- e Command line utilities (e.g., MSCONFIG, REGEDIT, CMD, SERVICES.MSC, MMC, MSTSC, NOTEPAD, EXPLORER, MSINFO32, DXDIAG) 13.E

14 **Demonstrate the proper application of the following control panel utilities that are common to all Microsoft operating systems, as well as those specific to unique Windows operating systems. Write a text describing the utilities and explain the results of the various applications.** 14

- a Internet options (e.g., connections, security, general, privacy, programs, advanced) 14.A
- b Display/Display settings 14.B
- c User accounts 14.C
- d Folder options (e.g., view hidden files, hide extensions, general options, view options) 14.D
- e System (e.g., performance, remote settings, system protection) 14.E
- f Windows firewall 14.F
- g Power options (e.g., hibernate, power plans, sleep/suspend, standby) 14.G

15 **Identify and describe the differences among the following basic operating system security settings. Write a brief paper that discusses when each setting is most applicable. Provide specific examples to support the claims.** 15

- a User and groups (e.g., administrator, power user, guest, standard user) 15.A
- b NTFS vs. share permissions (e.g., allow vs. deny, moving vs. copying file folders and files, file attributes) 15.B
- c Shared files and folders (e.g., administrative vs. local folders, permission propagation, inheritance) 15.C
- d System files and folders 15.D
- e User authentication (e.g., single sign-on) 15.E

Safe Mode and Command Prompt

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16 **Demonstrate an understanding and application of safe mode versus the command prompt. Describe specific scenarios when the safe mode should be used to solve a problem, as well as provide specific examples of the types of tasks that can be completed using the command prompt. Also, describe when the**

safe mode should be used with the command prompt. For example, safe mode can be used to solve problems with corrupted and/or malicious applications. 16

Preventative Maintenance Procedures

17 **Create and execute a plan for preventative maintenance for a computer system. The plan should include a schedule and description of the following procedures. Write a justification that explains to a client why preventative maintenance is important.** 17

- a Backup 17.A
- b Check disk 17.B
- c Defragmentation 17.C
- d Windows updates 17.D
- e Patch management 17.E
- f Driver/firmware updates 17.F
- g Antivirus updates 17.G

Security

18 **Research and describe the most common security threats to computer systems, such as social engineering, malware, phishing, viruses, etc. Investigate and distinguish among the following common prevention methods to secure a computer system. For a given scenario, identify the most applicable best practice to secure a workstation as well as describe methods for data destruction and disposal. Implement these practices and write a justification for each scenario solution. Provide supporting evidence for each solution, drawing on technical texts and industry standards. Prevention methods include:** 18

- a Physical security (e.g., lock doors, tailgating, biometrics, badges, key fobs, retinal, etc.) 18.A
- b Digital security (e.g., antivirus, firewalls, antispyware, user authentication, etc.) 18.B
- c User education 18.C
- d Principles of least privilege 18.D

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Networking

19 **Identify and describe the following fundamental principles of a small office / home office (SOHO) network (wireless and wired router).** 19

- a MAC filtering 19.A
- b Channels (1 -11) 19.B
- c Port forwarding, port triggering 19.C
- d SSID broadcase (on/off) 19.D
- e Wireless encryption 19.E
- f Firewall 19.F
- g DHCP (on/off) 19.G
- h DMZ 19.H

20 **Given scenarios for both wired and wireless small office home office (SOHO) networks, develop and execute an appropriate plan to secure the network. The plan should address, but is not limited, to the following:** 20

- a Wireless network 20.A
  1. Change default user-names and passwords 20.A.1
  2. Changing SSID 20.A.2
  3. Setting encryption 20.A.3
  4. Disabling SSID broadcast 20.A.4
  5. Enable MAC filtering 20.A.5
  6. Antenna access point placement 20.A.6
  7. Radio power levels 20.A.7
  8. Assign static IP addresses 20.A.8
- b Wired network 20.B
  1. Change default usernames and passwords 20.B.1
  2. Enable MAC filtering 20.B.2
  3. Assign static IP addresses 20.B.3
  4. Disabling ports 20.B.4
  5. Physical security 20.B.5

Servers

21 **Create a document that explains the purpose and components of a server. Include descriptions of the various types of servers (e.g., file, email, web, etc.) and the hardware specifications required to support each type. Using multiple resources, cite evidence to support the information identified and discussed. For example, a file server used in a home office will not require as much RAM (random access memory) as one that supports a large office building.** 21

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Pri
Devices

Explore and distinguish among the following printer types. Briefly describe their similarities and differences, as well as the imaging process required for

applicable printer types. Explain why it is important to know this information when installing and configuring printers. 22

- a Laser 22.A
- b Inkjet 22.B
- c Thermal 22.C
- d Impact 22.D

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23 For a given assignment, write and execute a plan to install, configure, and maintain a printer that is most appropriate for each of the following example situations. Explain and justify the selection with supporting evidence from technical manuals and computer systems texts. 23

- a Installing and configuring onto a specific operating system 23.A
- b Print device sharing (e.g., wired, wireless, printer hardware print server) 23.B
- c Printer sharing (e.g., via operating system settings) 23.C

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24 Distinguish among and describe the following peripheral devices commonly found in computer systems. Install and configure these devices conforming to technical manuals and industry standards. 24

- a Input devices (e.g., mouse, keyboard, touch screen, scanner, barcode reader, etc.) 24.A
- b Multimedia devices (e.g., digital cameras, microphone, webcam, camcorder, MIDI enabled devices) 24.B
- c Output devices (e.g., printers, speakers, display devices) 24.C

Laptops

25 Identify and explain the following laptop components. Citing specific examples, write a brief paper differentiating between the components and describing the purpose, properties, characteristics, and proper maintenance of each. Demonstrate proper installation and configuration of each component. For example, replace an optical drive in a laptop. 25

- a Expansion options (e.g., express card, PCMIA, SODIMM, flash) 25.A
- b Keyboard 25.B
- c Hard drive 25.C
- d Memory 25.D
- e Optical drive 25.E
- f Wireless card 25.F
- g Mini-PCIe 25.G
- h Screen 25.H
- i DC jack 25.I
- j Battery 25.J
- k Touchpad 25.K

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l Plastics 25.L

m Speaker 25.M

n System board 25.N

o CPU 25.O

26 Compare and contrast the following components within the display of a laptop and the laptop features. Citing specific examples, write a brief paper differentiating between the components and describing the purpose and characteristics of each. Demonstrate the execution of the features. For example, turn on the keyboard back light. 26

a Components: 26.A

1 Types (e.g., LCD, LED, OLED, plasma) 26.A.1

2 Wi-Fi antenna connector/placement 26.A.2

3 Inverter 26.A.3

4 Backlight 26.A.4

b Features 26.B

1 Special key functions 26.B.1

2 Docking station vs. port replicator 26.B.2

3 Physical laptop lock and cable lock 26.B.3

Mobile Devices

27 Explore the following basic features of mobile operating systems. Write a brief paper that compares and contrasts these systems on the following features. Drawing on multiple resources, explain why it is important to know this information when installing and configuring an operating system. 27

a Open source vs. closed source/vendor specific 27.A

b App source (app store and market) 27.B

c Screen orientation (accelerometer/gyroscope) 27.C

d Screen calibration 27.D

e GPS and geotracking 27.E

28 Research and describe the most common security threats related to mobile devices. Investigate and distinguish among the following common prevention methods to secure a mobile device. 28

a Passcode locks 28.A

b Remote wipes 28.B

c Locator applications 28.C

d Remote backup applications 28.D

e Failed login attempts restrictions 28.E

f Antivirus 28.F

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g Patching/OS updates 28.G

Troubleshooting

29 Investigate a simple problem and create a flowchart, or other graphic illustration, that explains the following steps representing a general troubleshooting theory. 29

a Gather information from the user or operator and back up data 29.A

b Verify the problem exists 29.B

c Isolate the cause of the problem and generate alternative solutions 29.C

d Plan a solution and resolve the problem 29.D

e Verify that the problem was resolved and prevent a future occurrence 29.E

f Document findings, resolution, and preventative maintenance plan 29.F

30 Given a problem related to the following components, follow the troubleshooting theory using appropriate tools. Identify the problem and document the findings and resolution. Include an explanation of the common symptoms, diagnostic procedures, and specific tools used that led to the problem resolution. 30

a Motherboards, RAM, CPU, and power 30.A

b Hard drives and RAID arrays 30.B

c Video and display 30.C

d Wired and wireless networks 30.D

e Client-side network connectivity 30.E

f Operating systems 30.F

g Security issues 30.G

h Laptops 30.H

i Printers 30.I

Customer Service and Client Relations

31 Compare and contrast the processes of servicing customers on the phone, online, on-site, or in a shop. Based on the findings, write a brief description of how to service a customer in each of these situations. Include the following in the description: 31

a Identify questions that a customer should be asked to identify his/her problem 31.A

b Approaches to dealing with difficult customers 31.B

c When it is appropriate to escalate a problem to a senior support team member 31.C

d How to document the services provided 31.D