

Chapter 1, "Motherboards, Processors, and Memory," there are **22 questions**: 20 Review Questions and 2 Performance-Based Questions.

Chapter 1: Review Questions

1. **Which computer component contains all the circuitry necessary for other components or devices to communicate with one another?**
 - A. Motherboard
 - B. CPU
 - C. RAM
 - D. Expansion bus
 - **Correct Answer: A.**
 - **Explanation:** The spine of the computer is the system board, otherwise known as the motherboard. All other computer components plug into the motherboard. On the motherboard, you will find the CPU, underlying circuitry, expansion slots, video components, RAM slots, and various other chips.
2. **You are told by a technician over the phone that you need to bring replacement DDR4 SDRAM memory. What type of packaging is used for DDR4 SDRAM memory?**
 - A. 224-pin DIMM
 - B. 240-pin DIMM
 - C. 288-pin DIMM
 - D. 296-pin DIMM
 - **Correct Answer: C.**
 - **Explanation:** DDR4 SDRAM is manufactured on a 288-pin DIMM, as is DDR5 (although the two are keyed differently and are not compatible). DIMMs with 224 pins and 296 pins do not exist. DIMMs with 240 pins are used for DDR2 and DDR3 SDRAM.
3. **You need to replace memory in a desktop PC and go to purchase RAM. When you are at the store, you need to find the appropriate type of memory. What memory chips would you find on a stick of PC3-16000?**
 - A. DDR-2000
 - B. DDR3-2000
 - C. DDR3-1600
 - D. PC3-2000
 - **Correct Answer: B.**
 - **Explanation:** PC3 refers to DDR3, and the speed of 16000 refers to the throughput in MBps. To calculate the speed of the memory chips, divide the throughput by 8, which comes out to 2000 MT/s, or DDR3-2000.
4. **A client wants you to build a new PC for her, with a smaller case and lower power requirements. When selecting a motherboard, which form factor should you choose for a smaller size and lower power consumption?**
 - A. ATX

- B. AT
 - C. DTX
 - D. ITX
 - **Correct Answer: D.**
 - **Explanation:** The ITX motherboard family consists of smaller boards that fit in standard or miniature cases and use less power than their larger counterparts. ATX are "standard" sized motherboards in today's world. AT is a legacy form factor that was bigger than ATX. There are no DTX motherboards.
5. **A motherboard failed on a desktop PC with an Intel Core i5-10600K processor. When you are looking for a replacement motherboard, which CPU socket does it need to have?**
- A. LGA 1366
 - B. LGA 1150
 - C. LGA 1200
 - D. LGA 1700
 - **Correct Answer: C.**
 - **Explanation:** The Core i5-10600K is a Comet Lake-series processor, which uses the LGA 1200 socket. LGA 1150 sockets are for older i7s, and the LGA 1366 socket is for even older ones than that. The LGA 1700 socket is for 12th-generation Intel Core processors.
6. **You have just replaced a processor in a computer and now need to add a cooling mechanism. What should you use to attach the cooling system to the processor?**
- A. Heat sink
 - B. Thermal paste
 - C. Fan
 - D. Superglue
 - **Correct Answer: B.**
 - **Explanation:** Thermal paste is used to attach heat sinks and fans to processors. A heat sink usually gets attached to the processor using thermal paste, and then the fan is attached to the heat sink. Superglue would make it adhere, but it does not transfer heat properly—it would likely melt and cause a mess and processor failure.
7. **A technician asks you how to get a computer's processor to run faster than it currently does. What are they trying to achieve?**
- A. Hyper-Threading
 - B. Overclocking
 - C. Virtualization
 - D. Multicore support
 - **Correct Answer: B.**
 - **Explanation:** Overclocking is when someone sets the speed of the processor to run faster than it was rated for. While overclocking can make a computer faster, it can also cause the processor to overheat, and it voids the warranty. Hyper-threading allows for a processor core to handle multiple processes simultaneously. Virtualization is when you create multiple virtual machines on a

computer. Multicore means that the processor has more than one core—it's not a configurable option.

8. **You are assembling a new computer and are looking at new cooling systems.**

Which of the following cooling systems requires the use of a pump?

- A. Liquid
- B. Thermal paste
- C. Heat sink
- D. Heat sink plus fan
- **Correct Answer:** A.
- **Explanation:** Liquid cooling systems require a reservoir of liquid and a pump to circulate the liquid. It's possible that the system could malfunction, causing a mess inside the computer. Thermal paste is used to adhere a heat sink to a processor. Heat sinks and fans do not use pumps.

9. **Which of the following types of processors will likely generally be preferred for mobile devices?**

- A. x64
- B. x86
- C. ARM
- D. LGA
- **Correct Answer:** C.
- **Explanation:** ARM processors generate less heat than do x64/x86 CISC processors and are therefore better options for mobile devices. LGA is a type of CPU socket.

10. **You press the front power button on a computer and the system boots. Later, you press it briefly and the system hibernates. When you press it again, the system resumes. You press and hold the button and the system shuts down. What is this feature called?**

- A. Programmable power
- B. Soft power
- C. Relay power
- D. Hot power
- **Correct Answer:** B.
- **Explanation:** Soft power is the feature whereby the front power button acts as a relay to initiate various system power changes, depending on the duration that the button is held. Programmable power, relay power, and hot power are not valid power options.

11. **You are training new technicians to install RAM and pointing out differences between packages. Which of the following are the numbers of pins that can be found on DIMM modules used in desktop motherboards? (Choose two.)**

- A. 180
- B. 184
- C. 200
- D. 204
- E. 232

- F. 240
- **Correct Answer:** B, F.
- **Explanation:** DIMMs used in desktop motherboard applications have one of four possible pin counts. SDR SDRAM is implemented on 168-pin modules. DDR SDRAM is implemented on 184-pin modules. DDR2 and DDR3 are implemented on 240-pin modules with different keying, and DDR4 and DDR5 DIMMs have 288 pins but different keying. Older dual-channel DIMM modules have 232 pins. Modules with 200 and 204 pins are used in the SODIMM line, and there are no modules with 180 pins.

12. You are installing a new computer, and the user wants to use virtualization. Which hardware components need to support virtual technology for this to work properly? (Choose two.)

- A. RAM
- B. Motherboard
- C. CPU
- D. BIOS
- **Correct Answer:** C, D.
- **Explanation:** For virtualization to work, both the CPU and BIOS need to support it. The operating system does as well. Virtualization support may need to be manually enabled in the BIOS. RAM does not need to support virtualization, and neither does the motherboard (except for the BIOS).

13. You find out that a disgruntled ex-employee's computer has a boot password that must be entered before the operating system is ever loaded. There is also a password preventing your access to the BIOS utility. Which of the following motherboard components can most likely be used to return the computer to a state that will allow you to boot the system without knowing the password?

- A. Cable header
- B. Power reset connector
- C. Toggle switch
- D. Jumper
- **Correct Answer:** D.
- **Explanation:** Most motherboards have a jumper or similar momentary closure mechanism that will allow you to clear the CMOS memory of any user settings and cause the BIOS to use factory defaults, including no user or supervisor passwords.

14. Your Core i5 fan has a 4-pin connector, but your motherboard only has a single 3-pin header with the CPU_FAN label. Which of the following will be the easiest solution to get the necessary cooling for your CPU?

- A. Plug the 4-pin connector into the 3-pin header.
- B. Buy a 4-pin to 3-pin adapter.
- C. Leave the plug disconnected and use only the heat sink.
- D. Add an extra chassis fan.
- **Correct Answer:** A.

- **Explanation:** The easiest solution that works to cool your CPU is to connect the four-pin connector into the three-pin header. The missing pin allows you to control the speed of the fan. Without it, the fan will run at top speed, which is fine, albeit a little noisier. There is no four-pin to three-pin power adapter. The heat sink alone should not be relied upon for proper cooling of modern CPUs, and an extra chassis fan isn't designed to specifically help cool the CPU.

15. You are installing a new video card into a PCIe slot. What is the combined total throughput of a PCIe 2.0 x16 slot?

- A. 500 MBps
- B. 1 GBps
- C. 16 GBps
- D. 32 GBps
- **Correct Answer:** C.
- **Explanation:** The PCIe 1.1 specification provided 250 Mbps of throughput per lane per direction. With the 2.x versions of PCIe, this rate was doubled to 500 Mbps. As a result, each v2.0 lane is capable of a combined 1 Gbps. An x16 slot consists of 16 lanes, for a total bidirectional throughput of 16 Gbps.

16. Which of the following allows you to perform the most complete restart of the computer without removing power?

- A. Start > Restart
- B. Start > Hibernate
- C. Reset button
- D. Power button
- **Correct Answer:** C.
- **Explanation:** The reset button causes the computer to return to nearly the same point it is in when you power it on, but without the need for power cycling. Using Restart in the Start menu does not reboot as deeply as the reset button. Hibernation is a power state that completely removes power after saving the contents of RAM to the hard drive; pressing the power button is required to resume the session in the same manner as starting the computer after a complete shutdown. The power button cannot be used as a method of restarting the system.

17. You have just found out that a new UEFI upgrade exists for your computer, and you obtain a copy on a flash drive to install it. Which of the following is most helpful when flashing the UEFI on a desktop computer system?

- A. DVD-ROM
- B. Uninterruptable power supply
- C. Internet connection
- D. Windows administrator password
- **Correct Answer:** B.
- **Explanation:** None of the options are required, but a UPS is by far the most helpful among the answers in that loss of power during this procedure can range from annoying to devastating.

18. The 32 GB of DDR4 memory has failed in a client's desktop computer. The client requests that you upgrade the system for better performance when replacing the RAM. Which of the following is the best option?
- A. Install two new 32 GB DDR4 RAM modules.
 - B. Install two new 128 GB DDR4 RAM modules.
 - C. Install two new 32 GB DDR5 RAM modules.
 - D. Install two new 128 GB DDR5 RAM modules.
 - **Correct Answer:** A.
 - **Explanation:** The only viable option listed is to install two new 32 GB DDR4 RAM modules. Check the motherboard documentation first to make sure the system will support that much memory, though. DDR4 does not come in modules larger than 64 GB. DDR5 is not compatible with DDR4 motherboards.
19. You are replacing an HP laptop's motherboard. Which type of motherboard should you use?
- A. ATX
 - B. AT
 - C. One for the specific model
 - D. mini-ITX
 - **Correct Answer:** C.
 - **Explanation:** Laptop motherboards are usually custom-built for the specific case. A replacement board should be obtained that is the exact same size as the one that failed.
20. You need to install a new video card into a desktop computer. What type of expansion slot is preferred today for high-performance graphics adapters?
- A. AGP
 - B. PCIe
 - C. PCI
 - D. SATA
 - **Correct Answer:** B.
 - **Explanation:** PCIe is the newest and fastest slot for video cards. AGP and PCI are legacy technologies. SATA is for hard drives.
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Performance-Based Question 1

You are attempting to install a new RAM module on a desktop computer. What are the steps to follow to do this properly?

- **Answer:**
 1. Make sure the power is off and unplug the computer.
 2. Unscrew the side panels and put them somewhere safe.
 3. Make sure you are properly grounded.
 4. Gently release the locking tabs on the memory slots by pushing them outward.
 5. Insert the new DIMM straight down into the slot.

6. Apply firm and even pressure downward until the locking tabs automatically snap into place.
 7. Nudge the tabs inward toward the module to make sure that they are tight.
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Performance-Based Question 2

Identify the component each arrow points to in the following image of an ATX motherboard.

- **Answer:** This question requires an image to display the components. The document provides an illustration with labels pointing to various components on an ATX motherboard. The components commonly identified on a motherboard include:
 - Central Processing Unit (CPU) slot
 - Expansion slots (e.g., PCIe x16, PCIe x1, PCI)
 - Random Access Memory (RAM) slots
 - Power connectors (e.g., 24-pin ATX)
 - Storage connectors (e.g., SATA, M.2)
 - Motherboard headers (e.g., USB, front panel)
 - BIOS/UEFI chip
 - CMOS battery

Chapter 2: Expansion Cards, Storage Devices, and Power Supplies - Review Questions

1. You are installing a new graphics adapter in a Windows 10 system. Which of the following expansion slots is designed for high-speed, 3D graphics adapters?
 - A. USB
 - B. NVMe
 - C. PCI
 - D. PCIe
 - **Correct Answer:** D.
 - **Explanation:** Although technically PCI could be used for graphics adapters, PCIe supports high-speed, 3D graphic video cards. PCIe offers better performance than older graphics adapters. USB can stream video, but it is not used for attachment of internal graphics adapters. NVMe is an SSD communications interface.
2. You need to install a new hard drive into a desktop computer. Which of the following is not one of the three major components of a hard disk drive system?
 - A. Drive interface
 - B. Disk controller

- C. Hard disk
 - D. Host adapter
 - **Correct Answer: A.**
 - **Explanation:** A conventional hard disk drive system consists of the hard disk and its often-integrated controller as well as a host adapter to gain access to the rest of the computer system. The drive interface is a common component of the controller and host adapter.
3. **You install a new NIC for a user, and he asks what it does. Which of the following best characterizes the functions of this device?**
- A. Multimedia
 - B. Communications
 - C. Input/Output
 - D. Storage
 - **Correct Answer: B.**
 - **Explanation:** A network interface card (NIC) is used as a communications device. It enables the computer to talk to other computers on a network. It does not provide multimedia, input/output (such as a USB port does), or storage capabilities.
4. **A client wants to ensure that their server does not lose power if their power supply fails. Which of the following best describes the type of power supply needed in this situation?**
- A. A power supply that provides twice as much wattage than what is needed to power system components
 - B. A power supply that provides a voltage output selector
 - C. A modular power supply
 - D. A redundant power supply
 - **Correct Answer: D.**
 - **Explanation:** To protect against a power supply failure, use a redundant power supply, which is basically two PSUs in one unit. More wattage will not help if the power supply fails. There are no voltage output selectors on PSUs. There are voltage input switches on some but that wouldn't help in this case. A modular power supply has removable and attachable cables to support a variety of peripherals.
5. **A client is looking for a desktop storage technology that provides the fastest possible data transfers. Which technology should you recommend?**
- A. SATA
 - B. NVMe
 - C. 10,000 rpm
 - D. 15,000 rpm
 - **Correct Answer: B.**
 - **Explanation:** The fastest SSD communications interface is NVMe. SATA 10,000 rpm and 15,000 rpm refer to conventional hard drive spin rates, and conventional hard drives will always be slower than SSDs.

6. **You are choosing an optical drive format for a client. Which optical disc format supports a data capacity of 25 GB?**
- A. Double-sided, double-layer DVD+R
 - B. Single-sided, single-layer Blu-ray Disc
 - C. Double-sided, single-layer DVD-R
 - D. Double-sided, single-layer DVD+R
 - **Correct Answer: B.**
 - **Explanation:** Blu-ray discs have a single-sided, single-layer capacity of 25 GB. A double-sided, single-layer DVD can store about 9.4 GB, and a double-sided, double-layer DVD can store about 17.1 GB.
7. **Which of the following best describes the concept of hot-swappable devices?**
- A. Power does not need to be turned off before the device is inserted or removed.
 - B. The device can be removed with power applied after it is properly stopped in the operating system.
 - C. Care must be taken when swapping the device because it can be hot to the touch.
 - D. The device can be swapped while still hot, immediately after powering down the system.
 - **Correct Answer: A.**
 - **Explanation:** Hot-swappable devices can be removed while the power to the system is still on. Warm-swappable devices need to be stopped in the operating system before being removed. The term has nothing to do with the heat level of the device.
8. **Of the following voltage pairings, which one accurately represents the input and output, respectively, of power supplies and AC adapters?**
- A. AC in, AC out
 - B. DC in, DC out
 - C. AC in, DC out
 - D. DC in, AC out
 - **Correct Answer: C.**
 - **Explanation:** Power supplies and AC adapters use standard wall outlets for an input of AC voltage, which they convert to the DC voltages required by the components to which they supply power.
9. **What are the output voltages that have been commonly produced by PC power supplies over the years? (Choose five.)**
- A. +3.3VDC
 - B. -3.3VDC
 - C. +5VDC
 - D. -5VDC
 - E. +12VDC
 - F. -12VDC
 - G. +110VDC
 - H. -110VDC

- **Correct Answer:** A, C, D, E, F.
- **Explanation:** A PC's power supply produces +3.3VDC, +5VDC, –5VDC, +12VDC, and –12VDC from a 110VAC input.

10. **You are installing a new power supply in a desktop computer. Which of the following statements about power supplies is true?**

- A. You must make sure that the voltage selector switch on the back of the power supply is switched to the lower setting if the computer is going to be used in Europe.
- B. SATA hard drives most often use the same type of power connector that PATA hard drives use.
- C. Power supplies require a 20-pin to 24-pin motherboard adapter to supply power to ATX-based motherboards.
- D. Power supplies convert AC input to DC output.
- **Correct Answer:** D.
- **Explanation:** PC power supplies accept alternating current (AC) as input and produce direct current (DC) for the internal components. Europe requires that the voltage selector switch be set at the higher setting. SATA drives most often use a specific power connector that is not compatible with the Molex connector used by PATA drives. ATX motherboards can have a 20- or 24-pin single power connector but an adapter is not always required.

11. **You have been asked to install a new hard drive for a client. Which of the following is not a consideration when installing an internal storage device?**

- A. You should match the form factor of the drive or adapt it to an available drive bay or slot.
- B. You should secure the drive with at least two screws on one side and preferably two on each side.
- C. Due to the high revolutions at which modern hard drives spin, you must secure an external power source because the internal power supplies do not have the capacity.
- D. You need to be sure that the routing of the drive's data cable, if applicable, does not obstruct the engineered flow of air across internal components.
- **Correct Answer:** C.
- **Explanation:** Today's hard drives, regardless of their rpm, have standard internal power connections. The other options are valid concerns when installing an internal drive.

12. **A client just bought a new digital camera for his photography business. Which of the following is specifically designed as an internal storage device for cameras?**

- A. Memory cards
- B. Optical discs
- C. Flash drives
- D. mSATA
- **Correct Answer:** A.
- **Explanation:** Memory cards such as SD cards were designed for devices such as digital cameras. Optical discs are larger and used mostly with laptops and

larger systems. Flash drives are USB. Some cameras may have a USB port, but that is external storage and not internal storage. mSATA is a laptop expansion card technology.

13. When installing multiple add-on cards of the same type, which type of cards might you need to bridge together to function as a single unit?

- A. Video
- B. Sound
- C. USB
- D. eSATA
- **Correct Answer:** A.
- **Explanation:** PCIe video cards may be bridged together, enabling two cards to function as one system. Sound cards and I/O expansion cards such as USB and eSATA cards do not have bridging capabilities.

14. You are purchasing a new video card for a desktop computer. For the best performance, which type of video card should you purchase?

- A. PCI x16
- B. PCI x128
- C. AGP
- D. PCIe x128
- E. PCIe x16
- **Correct Answer:** E.
- **Explanation:** For a video card, the best standard currently available is PCIe, and the widest channel width is x16. There are no PCI x16 or PCI x128 slots, nor is there a PCIe x128 slot. AGP is an older video expansion standard that is now obsolete.

15. Which of the following is not a consideration when upgrading power supplies?

- A. You might find that you do not have a matching motherboard connector on your new power supply.
- B. You might find that your case has a nonremovable power supply.
- C. You might find that your power rating is not adequate on the new power supply.
- D. You might find that you do not have enough of the appropriate connectors coming from the power supply for the devices that you have installed.
- **Correct Answer:** B.
- **Explanation:** Personal computers do not have permanently installed power supplies. Like other electrical and electronic components, power supplies can and do fail on a regular basis. Permanently mounting a power supply to a chassis would be a disservice to the consumer. You should consider the cumulative power needs of your installed components, and you might have to obtain adapters and splitters if you do not have enough or you have the wrong types of connectors coming from the power supply.

16. You are choosing a flash standard for a client. They want the smallest flash cards possible. Which standard should you recommend?

- A. SD

- B. CompactFlash
- C. microSD
- D. miniSD
- E. xD
- **Correct Answer: C.**
- **Explanation:** The smallest of the options is microSD, at 15 mm × 11 mm. Perhaps "micro" gives it away, but that also makes it easy to remember. SD cards are 32 mm × 24 mm. CompactFlash cards are the largest, at 36 mm × 43 mm. MiniSD cards measure 21.5 mm × 20 mm, and xD cards are 20 mm × 25 mm.

17. **Your goal is to build the fastest computer possible. Which of the following hard drive technologies should you choose for the fastest read performance?**

- A. M.2 PCIe
- B. M.2 SATA
- C. NVMe PCIe
- D. NVMe SATA
- **Correct Answer: C.**
- **Explanation:** M.2 and NVMe are both relatively new SSD options, and both are incredibly fast. NVMe is slightly faster, though. SATA is limited to 600 Mbps transfer speeds, whereas PCIe is not. An NVMe PCIe card can sustain data read rates of about 3,500 Mbps.

18. **You have been asked to configure a RAID 5 system for a client. Which of the following statements about RAID 5 is true?**

- A. It provides fault tolerance but no performance improvement.
- B. It provides performance improvement but no fault tolerance.
- C. If multiple drives in the array fail, the data can be saved provided that one drive is still operational.
- D. It requires at least three drives to implement.
- **Correct Answer: D.**
- **Explanation:** RAID 5 is disk striping with parity, meaning it combines performance improvement with fault tolerance. It requires a minimum of three drives to implement, but can sustain only a single drive failure without data loss.

19. **You have a motherboard with integrated video, and the video fails. You install a video add-on card. Which of the following statements are the most accurate?**

(Choose two.)

- A. The add-on card will not function properly because of the integrated video.
- B. The add-on card will function if it is bridged to the integrated video chipset.
- C. The add-on card will be detected automatically and function properly if it's PCIe.
- D. For the card to work properly, you might need to disable the integrated video in the BIOS.
- E. The add-on card will work properly by using the integrated card's video driver.
- **Correct Answer: C, D.**

- **Explanation:** The add-on card will often be detected automatically and function properly if it's PCIe. However, for the card to work properly, you might need to disable the integrated video in the BIOS. The add-on card does not use the integrated card's video driver, nor is it bridged to the integrated video chipset. It will function properly despite the integrated video.
20. **When replacing a power supply, which of the following tends to vary among power supplies and must be chosen properly to support all connected devices?**
- A. Wattage
 - B. Voltage
 - C. Amperage
 - D. Resistance
 - **Correct Answer:** A.
 - **Explanation:** Power supplies are rated in watts. When you purchase a power supply, you should make sure the devices inside the computer do not require more wattage than the chosen power supply can offer. The voltage is fairly standard among power supplies, and it has nothing to do with the devices connected to the power supply. Amperage and resistance are not selling points for power supplies. Another thing that could vary is the number of power connectors—make sure the new power supply has enough to support all installed peripherals.

Chapter 3: Peripherals, Cables, and Connectors - Review Questions

1. **Which of the following could be used with an analog monitor? (Choose two.)**
- A. HDMI
 - B. DVI-A
 - C. DVI-D
 - D. DisplayPort
 - E. VGA
 - **Correct Answer:** B, E.
 - **Explanation:** Analog monitors require an analog signal. VGA is an analog video standard and will work, as will DVI-A (DVI-I would also work). HDMI, DVI-D, and DisplayPort are all digital standards.
2. **You are attaching an external hard drive to a computer with USB 2.0 ports. The user is concerned about data transfer speed. What is the maximum speed of USB 2.0?**
- A. 480 Mbps
 - B. 5 Gbps
 - C. 10 Gbps
 - D. 20 Gbps
 - **Correct Answer:** A.
 - **Explanation:** USB 2.0 has a maximum speed of 480 Mbps. For comparison, USB 3.0 is 5 Gbps, USB 3.1 is 10 Gbps, USB 3.2 is 20 Gbps, and USB4 is up to 40 Gbps.

3. **You got a new desktop computer for a designer at your company. On the front panel is a rectangular yellow USB port. What does that mean?**
- A. It's USB 2.0.
 - B. It's USB 3.0.
 - C. It's a port capable of charging devices even with the system powered off.
 - D. It's a port to be used with USB-C compatible devices.
 - **Correct Answer: C.**
 - **Explanation:** A yellow USB port is an "always on" charging port. It could be either USB 2.0 or USB 3.0. USB-C connectors are oval in shape, unlike the older rectangular USB connectors.
4. **You are installing a replacement monitor on a desktop computer. Which of the following is true regarding a monitor's refresh rate?**
- A. As long as the graphics adapter can refresh the image at a particular rate, the attached monitor can accommodate that refresh rate.
 - B. The refresh rate is normally expressed in MHz.
 - C. The refresh rate is normally selected by using the controls on the front panel of the monitor.
 - D. As you lower the resolution, the maximum refresh rate allowed tends to increase.
 - **Correct Answer: D.**
 - **Explanation:** As you lower the resolution, the maximum refresh rate allowed tends to increase. The refresh rate is most often expressed in cycles per second (Hz), not millions of cycles per second (MHz). You must usually select the refresh rate from the display settings dialog boxes, not through the monitor's built-in menu system. Both the monitor and adapter must agree on the selected refresh rate; if either device does not support it, the rate cannot be used.
5. **Which of the following connector types is typically not associated with hard drive use?**
- A. USB-C
 - B. eSATA
 - C. DB-9
 - D. SCSI
 - **Correct Answer: C.**
 - **Explanation:** DB-9 connectors are most often used with serial cables and are not associated with hard drives. USB-C, eSATA, and SCSI are all examples of connectors used with hard drives.
6. **The company photographer is interested in buying a new digital camera. He wants to be able to plug it directly into his laptop to transfer pictures for editing. What type of connector will most likely be on his camera?**
- A. Mini-USB
 - B. Thunderbolt
 - C. Molex
 - D. Lightning
 - **Correct Answer: A.**

- **Explanation:** For smaller electronic devices such as cameras, micro-USB and mini-USB connectors are common. Thunderbolt is primarily used for video, Molex is a power connector, and Lightning is an Apple proprietary connector.
7. **You are installing a new video card that has an HDMI port. Which of the following is true about HDMI cables? (Choose all that apply.)**
- A. They can transmit analog or digital signals.
 - B. They can transmit audio as well as video.
 - C. They are not used to connect to projectors.
 - D. They can use HDMI or mini-HDMI connectors.
 - **Correct Answer:** B, D.
 - **Explanation:** HDMI cables transmit digital video and audio signals. They can be used to connect to projectors or monitors. HDMI cables can have standard HDMI connectors, mini-HDMI connectors, or micro-HDMI connectors.
8. **Which of the following display interfaces is equivalent to DisplayPort with PCIe added in?**
- A. Thunderbolt
 - B. HDMI
 - C. DVI
 - D. VGA
 - **Correct Answer:** A.
 - **Explanation:** Thunderbolt adds PCIe functionality to the DisplayPort interface.
9. **Which two of the following standards use the same connector? (Choose two.)**
- A. eSATA
 - B. Thunderbolt 3
 - C. USB4
 - D. USB 2.0
 - E. Mini-USB
 - **Correct Answer:** B, C.
 - **Explanation:** Thunderbolt 3 and USB4 both use the USB-C connector. eSATA, USB 2.0 (standard A/B/mini/micro), and Mini-USB use different connector types.
10. **How do you connect a DVI-A interface on a peripheral to a DVI-D interface on the computer?**
- A. With a DVI-I cable.
 - B. With a cable that is terminated on one end with a DVI-A connector and on the other end with a DVD-D connector.
 - C. You wouldn't interconnect those two interfaces.
 - D. With a standard DVI cable.
 - **Correct Answer:** C.
 - **Explanation:** You cannot interconnect DVI-A (analog) and DVI-D (digital) interfaces directly because they use different signal types. A DVI-I cable handles both analog and digital signals, but connecting a pure analog DVI-A to a pure digital DVI-D is not possible without an active converter, which is not an option here.

11. A technician says he needs to provide power to an older IDE hard drive and a DVD-ROM in a desktop. The computer now has a new fully modular power supply, and the technician wants to know what type of power connectors he should use. What do you tell him?
- A. SATA
 - B. SCSI
 - C. Serial
 - D. Molex
 - **Correct Answer:** D.
 - **Explanation:** A Molex connector is a power connector specifically for older IDE (PATA) storage devices, including hard drives and optical drives. SATA drives use a different power connector.
12. Which of the following connectors is oval shaped?
- A. Micro-USB
 - B. Mini-USB
 - C. Thunderbolt 2
 - D. Thunderbolt 3
 - **Correct Answer:** D.
 - **Explanation:** Thunderbolt 3 uses the oval-shaped USB-C connector. Thunderbolt 2 used a proprietary connector that was more square. Micro-USB and Mini-USB connectors are more trapezoidal in shape.
13. Which of the following connector types are capable of conducting power and transmitting data? (Choose all that apply.)
- A. Lightning
 - B. Molex
 - C. USB-C
 - D. DB-9
 - E. Micro-USB
 - **Correct Answer:** A, C, E.
 - **Explanation:** Lightning, USB-C, and Micro-USB connectors (parts of USB cables) are capable of transmitting both power and data. A Molex connector is power-only. A DB-9 is for serial cables and is data-only.
14. Which of the following statements is true about eSATA cables and connectors?
- A. eSATA cables provide power and data to devices.
 - B. eSATA connectors are smaller than USB-C connectors.
 - C. eSATA is faster than USB4 and Thunderbolt 3.
 - D. eSATA maximum throughput is 6 Gbps.
 - **Correct Answer:** D.
 - **Explanation:** eSATA standards limit throughput to 6 Gbps. Standard eSATA cables typically do not provide power, though some versions do. Its connectors are larger than USB-C connectors. It is slower than USB4 and Thunderbolt 3, which can achieve up to 40 Gbps.
15. Which of the following is not an example of a connector for a standard peripheral input device?

- A. 1/8" jack
- B. Molex
- C. D-sub
- D. USB
- **Correct Answer:** B.
- **Explanation:** Peripherals often use USB. Audio devices like microphones and speakers use 1/8" jacks. D-sub connectors, though rarer for input devices today, have historically been used. Molex connectors are power connectors for PATA hard drives and optical drives, not standard peripheral input devices.

16. **You are asked to hook up a projector in a classroom. What type of cable are you most likely to need?**

- A. USB Type A
- B. eSATA
- C. HDMI
- D. DB-9
- **Correct Answer:** C.
- **Explanation:** A projector uses a standard video cable. In this case, HDMI is the most likely choice as it transmits digital video and audio signals and is commonly used for displays. eSATA is for hard drives, and DB-9 is a slow serial cable. While a projector might have a USB interface, HDMI is the preferred selection for video output.

17. **A user with an iPhone 12 needs to charge her device and asks you to bring a cable. Which of the following connector types should you ensure that the cable has?**

- A. Thunderbolt
- B. Lightning
- C. Mini-USB
- D. Micro-USB
- **Correct Answer:** B.
- **Explanation:** Starting with the iPhone 5, Apple products use the proprietary Lightning connector for charging and connecting peripherals. Thunderbolt connectors are found on MacBooks for peripherals, and iPhones do not have built-in Mini-USB or Micro-USB connectors.

18. **Which of the following types of cables will transfer data at the slowest rate?**

- A. USB4
- B. Serial
- C. Thunderbolt 3
- D. HDMI
- **Correct Answer:** B.
- **Explanation:** Classic serial ports and serial cables (like DB-9) have the slowest data transmission speeds compared to the other options. USB4 can go up to 40 Gbps, Thunderbolt 3 up to 40 Gbps, and HDMI is also a high-speed digital standard.

19. **What is the maximum data transfer rate of USB High Speed?**

- A. 10 Gbps
- B. 5 Gbps
- C. 480 Mbps
- D. 12 Mbps
- **Correct Answer:** C.
- **Explanation:** USB High Speed (USB 2.0) has a maximum speed of 480 Mbps. Full Speed USB (USB 1.1) is 12 Mbps, SuperSpeed (USB 3.0) runs at 5 Gbps, and SuperSpeed+ (USB 3.1) at 10 Gbps.

20. VGA cables use what type of signal between the adapter and monitor?

- A. Digital
- B. Analog
- C. Composite
- D. Compressed
- **Correct Answer:** B.
- **Explanation:** VGA signals are analog, uncompressed, component signals that carry all of the video information for all three components of the original RGB signal. They are not digital, composite, or compressed.

Chapter 4: Printers and Multifunction Devices - Review Questions

1. **Which voltage is applied to the paper to transfer the toner to the paper in an EP process laser printer?**
 - A. +600VDC
 - B. -600VDC
 - C. +6000VDC
 - D. -6000VDC
 - **Correct Answer:** A.
 - **Explanation:** Because the toner on the drum has a slight negative charge (-100VDC), it requires a positive charge to transfer it to the paper; +600VDC is the voltage used in an EP process laser printer.
2. **Which types of printers are referred to as page printers because they receive their print job instructions one page at a time? (Choose two.)**
 - A. Daisy-wheel
 - B. Dot-matrix
 - C. Inkjet
 - D. Laser
 - E. Thermal
 - **Correct Answer:** C, D.
 - **Explanation:** A page printer is a type of computer printer that prints a page at a time. Common types of page printers are the inkjet printer and the laser printer.
3. **Which of the following is not an advantage of a Universal Serial Bus (USB) printer interface?**

- A. It has a higher transfer rate than a serial connection.
 - B. It has a higher transfer rate than a parallel connection.
 - C. It automatically recognizes new devices.
 - D. It allows the printer to communicate with networks, servers, and workstations.
 - **Correct Answer:** D.
 - **Explanation:** The rate of transfer and the ability to recognize new devices automatically are two of the major advantages that currently make USB the most popular type of printer interface. However, it is the network printer interface that allows the printer to communicate with networks, servers, and workstations.
4. **You have a finance manager who needs to print contracts in triplicate. Which type of printers are best for printing on multipart forms?**
- A. Inkjet printers
 - B. Laser printers
 - C. Thermal printers
 - D. Dot-matrix printers
 - **Correct Answer:** D.
 - **Explanation:** Dot-matrix printers are impact printers and therefore are the best for multipart forms. Daisy-wheel printers can be used with multipart forms as well.
5. **Which step in the EP imaging process uses a laser to discharge selected areas of the photosensitive drum, thus forming an image on the drum?**
- A. Exposing
 - B. Transferring
 - C. Developing
 - D. Cleaning
 - **Correct Answer:** A.
 - **Explanation:** The exposing step uses a laser to discharge selected areas of the photosensitive drum, thus forming an image on the drum.
6. **Which of the following is fed through an extruder on a 3D printer to create objects?**
- A. Resin
 - B. Dye
 - C. Filament
 - D. Extrusion powder
 - **Correct Answer:** C.
 - **Explanation:** 3D printers use filament or resin to create objects. Printers that have an extruder use filament, which is often plastic but can contain metals, too. 3D printers do not use dye. There is no extrusion powder.
7. **Recently, employees have been printing off unauthorized materials that may contain hate speech. Which of the following can be used to see which users printed specific jobs?**
- A. Audit logs
 - B. Badging
 - C. User authentication
 - D. Secured prints

- **Correct Answer:** A.
 - **Explanation:** Audit logs will track print jobs and the users who printed them. User authentication is where a user is required to log into the printer. This can be done via badging—or swiping an employee badge on a badge reader on the printer—or by manually entering credentials. Secured prints is when a print job is held until a user authenticates at the printer and tells it to start printing.
8. **Which device in an inkjet printer contains the print head?**
- A. Toner cartridge
 - B. Ink cartridge
 - C. Daisy wheel
 - D. Paper tray
 - **Correct Answer:** B.
 - **Explanation:** In an inkjet printer, the ink cartridge is the actual print head. This is where the ink is expelled to form letters or graphics. Toner cartridges are used by laser printers to store toner. A daisy wheel is the device that impacts the letters on the paper in a daisy-wheel printer. Paper trays are the storage bins in laser printers and inkjet printers that allow the pickup rollers to feed the paper into the printer.
9. **What is the correct order of the steps in the EP imaging process?**
- A. Developing, exposing, transferring, fusing, charging, cleaning, processing
 - B. Charging, processing, exposing, developing, transferring, fusing, cleaning
 - C. Processing, transferring, exposing, developing, charging, cleaning, fusing
 - D. Processing, charging, exposing, developing, transferring, fusing, cleaning
 - **Correct Answer:** D.
 - **Explanation:** The correct sequence in the EP imaging process is processing, charging, exposing, developing, transferring, fusing, and cleaning.
10. **The network administrator has set up security on office MFDs that requires users to authenticate before printing. Which of the following are valid methods for users to authenticate to the MFD? (Choose two.)**
- A. Use an authentication log.
 - B. Enable secured print.
 - C. Type their username and password on the MFD's touchscreen.
 - D. Use SMB.
 - E. Use their company ID for badging.
 - **Correct Answer:** C, E.
 - **Explanation:** Two ways for users to authenticate are to use user authentication (which requires typing in the username and password) or badging, which involves swiping an employee badge on a badge reader on the printer.
11. **What is typically included in the EP laser printer toner cartridge? (Choose three.)**
- A. Toner
 - B. Print drum
 - C. Laser
 - D. Cleaning blade
 - **Correct Answer:** A, B, D.

- **Explanation:** A laser printer toner cartridge typically includes toner, the print drum (photosensitive drum), and the cleaning blade. The laser is part of the laser scanning assembly, which is a separate component in the printer.

12. What happens during the developing stage of laser printing?

- A. An electrostatic charge is applied to the drum to attract toner particles.
- B. Heat is applied to the paper to melt the toner.
- C. The laser creates an image of the page on the drum.
- D. An electrostatic charge is applied to the paper to attract toner particles.
- **Correct Answer:** A.
- **Explanation:** In the developing step, toner is transferred to the areas that were exposed in the exposing step. A metallic roller called the developing roller inside an EP cartridge acquires a –600VDC charge (bias voltage) from the HVPS, and the toner sticks to this roller. The toner is then attracted to the areas on the photosensitive drum that have a lesser negative charge (–100VDC) after being exposed by the laser.

13. Which of the following are possible interfaces for printers? (Choose three.)

- A. Parallel
- B. SATA
- C. USB
- D. Network
- **Correct Answer:** A, C, D.
- **Explanation:** Printers can communicate via parallel, serial, USB, wireless, and network connections. SATA is a bus interface that connects host bus adapters to storage devices such as hard drives and optical drives.

14. You have just installed a new printer, but it prints only garbled text. Which of the following is likely the problem?

- A. Wrong IP address
- B. Worn print head
- C. Incorrect printer drivers
- D. Unsupported printer
- **Correct Answer:** C.
- **Explanation:** If a printer is using out-of-date or incorrect printer drivers, the printer may produce pages of garbled text. The solution is to ensure that the most recent printer drivers are downloaded from the manufacturer's website.

15. Which printer contains a wheel that looks like a flower with raised letters and symbols on each "petal"?

- A. Inkjet printer
- B. Daisy-wheel printer
- C. Dot-matrix printer
- D. Laser printer
- **Correct Answer:** B.
- **Explanation:** The daisy-wheel printer gets its name because it contains a wheel with raised letters and symbols on each "petal".

16. What part of a laser printer supplies the voltages for charging and transferring corona assemblies?

- A. High-voltage power supply (HVPS)
- B. DC power supply (DCPS)
- C. Controller circuitry
- D. Transfer corona
- **Correct Answer: A.**
- **Explanation:** The high-voltage power supply (HVPS) is the part of the laser printer that supplies the voltages for charging and transferring corona assemblies.

17. Which printer part gets the toner from the photosensitive drum onto the paper?

- A. Laser-scanning assembly
- B. Fusing assembly
- C. Corona assembly
- D. Drum
- **Correct Answer: C.**
- **Explanation:** The transfer corona assembly gets the toner from the photosensitive drum onto the paper. For some printers, this is a transfer corona wire; for other printers, it is a transfer corona roller.

18. Which step in the laser printer printing process occurs immediately after the exposing phase?

- A. Charging
- B. Fusing
- C. Transferring
- D. Developing
- **Correct Answer: D.**
- **Explanation:** Developing happens after exposing. The correct order is processing, charging, exposing, developing, transferring, fusing, and cleaning.

19. Which laser printer component permanently presses the toner into the paper?

- A. Transfer corona
- B. Fuser assembly
- C. Printer controller circuitry
- D. Paper transport assembly
- **Correct Answer: B.**
- **Explanation:** The fuser assembly presses and melts the toner into the paper. The transfer corona transfers the toner from the drum to the paper. The printer controller circuitry converts signals from the PC into signals for the various printer assemblies. The paper transport assembly controls the movement of the paper through the printer.

20. Which of the following most accurately describes how to obtain a firmware upgrade for your laser printer?

- A. Download the firmware upgrade for free from the manufacturer's website.
- B. Pay to download the firmware upgrade from the manufacturer's website.

- C. Have a certified laser printer technician come to your site and install a new firmware chip.
- D. Contact the manufacturer of the printer, and they will send you the firmware upgrade on a DVD.
- **Correct Answer:** A.
- **Explanation:** Firmware upgrades for laser printers are downloaded for free from the manufacturer's website. A technician does not need to install a new chip, because firmware is upgraded via software. It's unlikely that the manufacturer will send you the upgrade on a DVD; it will refer you to its website to download it.

Chapter 5: Networking Fundamentals

1. _____ is immune to electromagnetic or radio-frequency interference.
 - A. Twisted pair cabling
 - B. CSMA/CD
 - C. Broadband coaxial cabling
 - D. Fiber-optic cabling
 - **Correct Answer:** D.
 - **Explanation:** Companies that want to ensure the safety and integrity of their data should use fiber-optic cable because it is not affected by electromagnetic or radio-frequency interference. Even though some copper cables have shielding, they are not immune to EMI or RFI. CSMA/CD is an access method, not a cable type.
2. Which of the following is a type of connector used with coaxial cable?
 - A. RJ-11
 - B. RJ-45
 - C. F type
 - D. SC
 - **Correct Answer:** C.
 - **Explanation:** Coaxial cable can use BNC connectors and F type connectors. RJ-11 and RJ-45 are twisted pair connectors. SC is a fiber-optic connector.
3. You need to put a connector on the end of an Ethernet crossover cable. The existing end has a white and green colored wire at pin 1. What colour do you need to make pin 1 on the new end?
 - A. White/green
 - B. Green
 - C. White/orange
 - D. Orange
 - **Correct Answer:** C.
 - **Explanation:** A crossover cable will flip pins 1 and 3 on each end. Therefore, this end needs to have the white/orange wire as pin 1. The correct order for this cable should be white/orange, orange, white/green, blue, white/blue, green, white/brown, brown.

4. _____ is the type of media access method used by NICs that listen to or sense the cable to check for traffic and send only when they hear that no one else is transmitting.
- A. T568A/T568B
 - B. CSMA/CD
 - C. CSMA/CA
 - D. Demand priority
 - **Correct Answer:** B.
 - **Explanation:** Carrier Sense Multiple Access with Collision Detection (CSMA/CD) specifies that the NIC pause before transmitting a packet to ensure that the line is not being used. If no activity is detected, then it transmits the packet. If activity is detected, it waits until it is clear. In the case of two NICs transmitting at the same time (a collision), both NICs pause to detect and then retransmit the data. CSMA/CA listens to the line as well but tries to avoid collisions. T568A/T568B are twisted pair wiring standards. Demand priority is a media access method, but it was not discussed in the chapter as it's not related to the A+ exam.
5. **What is the lowest grade of UTP that is rated for 100 Mbps transmission?**
- A. Cat 5
 - B. Cat 5e
 - C. Cat 6
 - D. Cat 6a
 - **Correct Answer:** A.
 - **Explanation:** Cat 5 was the first UTP standard ratified for 100 Mbps transmissions. Before that, Cat 3 was popular but only supported 10 Mbps. Cat 5e, Cat 6, and Cat 6a all support at least 1 Gbps and came after Cat 5.
6. **A physical star topology consists of several workstations that branch off a central device called a _____.**
- A. NIC
 - B. Bridge
 - C. Router
 - D. Hub
 - **Correct Answer:** D.
 - **Explanation:** A hub or a switch is at the centre of a star topology. A NIC is a network card, which each computer must have to be on the network. Bridges and routers are higher-level connectivity devices that connect network segments or separate networks together.
7. **Of all the network cabling options, _____ offers the longest possible segment length.**
- A. Unshielded twisted pair
 - B. Coaxial
 - C. Fiber-optic
 - D. Shielded twisted pair
 - **Correct Answer:** C.

- **Explanation:** Fiber-optic cable can span distances of several kilometres because it has much lower attenuation, crosstalk, and interference as compared to copper cables.
8. **What devices transfer packets across multiple networks and use tables to store network addresses to determine the best destination?**
- A. Routers
 - B. Firewalls
 - C. Hubs
 - D. Switches
 - **Correct Answer:** A.
 - **Explanation:** Routers are designed to route (transfer) packets across networks. They are able to do this routing, determining the best path to take, based on the internal routing tables that they maintain.
9. **Which of the following networking hardware devices is capable of creating VLANs?**
- A. Firewall
 - B. Patch panel
 - C. Unmanaged switch
 - D. Managed switch
 - **Correct Answer:** D.
 - **Explanation:** A managed switch can create virtual LANs (VLANs) using its management software. A firewall is a hardware or software solution that serves as your network's security guard. Patch panels and unmanaged switches cannot create VLANs.
10. **Which of the following wireless communication standards is often described in terms of a wireless personal area network?**
- A. Bluetooth
 - B. Infrared
 - C. Cellular
 - D. Ethernet
 - **Correct Answer:** A.
 - **Explanation:** Bluetooth networks are often called wireless personal area networks (WPANs).
11. **Your ISP has just finished running fiber-optic cable in your neighbourhood, and you want to switch from cable Internet to a faster fiber-optic connection. Which of the following statements is true about how you will get an Internet connection?**
- A. You will continue to use your cable modem.
 - B. You need to switch to using a DSL modem.
 - C. You need to switch to using an ONT.
 - D. You need to switch to using PoE.
 - **Correct Answer:** C.
 - **Explanation:** Fiber-optic Internet connections use an optical network terminal (ONT) to terminate the fiber and translate it into a digital connection over copper

cable inside your home. A cable modem and DSL modem connect copper to copper. Power over Ethernet (PoE) is not relevant in this situation.

12. If you are going to run a network cable in the space above the drop ceiling in your office, which type of cable should you use?

- A. Plenum
- B. PVC
- C. Coaxial
- D. Fiber-optic
- **Correct Answer:** A.
- **Explanation:** For areas where a cable must be fire retardant, such as in a drop ceiling, you must run plenum-grade cable. Plenum refers to the coating on the sleeve of the cable, not the copper or fiber within the cable itself. PVC is the other type of coating typically found on network cables, but it produces poisonous gas when burned.

13. Which of the following connector types is an MFF connector?

- A. BNC
- B. ST
- C. SC
- D. LC
- **Correct Answer:** D.
- **Explanation:** The local connector (LC) is a mini form factor (MFF) fiber-optic connector developed by Lucent Technologies. If it helps, think of LC as "Little Connector".

14. What Ethernet specification would you be running if you needed to make a connection of 10 Gbps over a distance of 5 kilometres?

- A. 10GBaseER
- B. 10GBaseT
- C. 10GBaseSR
- D. 10GBaseLR
- **Correct Answer:** A.
- **Explanation:** If you need to make a connection that is 5 kilometres long, then you are limited to fiber-optic cable, specifically single-mode fiber (SMF). Two common SMF standards are 10GBaseER and 10GBaseEW (think of the E as extended). A T designation in an Ethernet standard refers to twisted pair. SR and LR are fiber standards that do not stretch for 5 kilometres.

15. Which of the following are advantages to using a SAN? (Choose two.)

- A. More storage space on the network
- B. More efficient data storage
- C. Faster data access
- D. Automated data backups
- **Correct Answer:** B, C.
- **Explanation:** Storage area networks (SANs) have many advantages, including block-level data storage, which is more efficient. They also reduce network loads, provide faster data access, and are easily expandable. They do not inherently

provide more storage space (although they are easy to expand) or do automated data backups (although they are easier to set up).

16. **You are installing a network at a friend's house, and it's impossible to run a network cable from one point in the house to another. Your friend does not want to use wireless networking. Which of the following is the best option to get network connectivity between the two points?**

- A. Power over Ethernet injector
- B. Power over Ethernet switch
- C. Ethernet over Power
- D. Router
- **Correct Answer: C.**
- **Explanation:** Ethernet over Power can transmit network signals over power lines within a closed circuit, such as a house. It's the best choice. PoE devices provide power to devices that have only an Ethernet connection available. A router is for connecting network segments together.

17. **What type of device will block unwanted traffic from your network using a set of rules called an ACL?**

- A. Router
- B. Firewall
- C. Switch
- D. NAS
- **Correct Answer: B.**
- **Explanation:** The job of a firewall is to block unwanted network traffic. Firewalls do this by using a list of rules called an access control list (ACL). Routers connect networks to each other, and switches are central connectivity points for networks. A network attached storage (NAS) device is like a dedicated file server.

18. **What type of coaxial cable is recommended for digital television cable signals?**

- A. RG-6
- B. RG-8
- C. RG-58
- D. RG-59
- **Correct Answer: A.**
- **Explanation:** The two RG standards used for cable television are RG-6 and RG-59. Of the two, RG-6 is better because it can run longer distances and can handle digital signals. RG-59 is for analog signals only. RG-8 is thicknet coax, and RG-58 is thinnet coax.

19. **Which of the following devices works with MAC addresses to determine what to do with network traffic?**

- A. Hub
- B. Router
- C. Patch panel
- D. Switch
- **Correct Answer: D.**

- **Explanation:** A switch is a Layer 2 device; therefore, it works with hardware (MAC) addresses. Hubs and patch panels work at Layer 1 and deal with bits, and routers work at Layer 3 and work with logical IP addresses.

20. Transmitting at 10 Gbps, how far can signals on an MMF cable travel?

- A. 100 meters
- B. 550 meters
- C. 1 kilometre
- D. 40 kilometres
- **Correct Answer:** B.
- **Explanation:** Multimode fiber (MMF) can transmit up to 550 metres, depending on the Ethernet specification. Other standards using MMF can transmit only up to 300 metres. If you need to transmit up to 40 kilometres, you will have to use single-mode fiber (SMF).

Chapter 6: Introduction to TCP/IP

1. You have just set up a network that will use the TCP/IP protocol, and you want client computers to obtain IP configuration information automatically. Which type of server do you need for this?

- A. DNS
- B. DHCP
- C. NAT
- D. IP configuration server
- **Correct Answer:** B.
- **Explanation:** A Dynamic Host Configuration Protocol (DHCP) server provides IP configuration information to hosts when they join the network. A Domain Name System (DNS) server resolves hostnames to IP addresses. Network Address Translation (NAT) translates private IP addresses into public IP addresses. There is no IP configuration server (other than a DHCP server).

2. Which of the following protocols was designed to access information stored in an information directory, such as employee phone books?

- A. FTP
- B. LDAP
- C. RDP
- D. CIFS
- **Correct Answer:** B.
- **Explanation:** Lightweight Directory Access Protocol (LDAP) is designed to access information stored in an information directory, typically known as an LDAP directory or LDAP database, which commonly includes employee data and network configuration data. FTP is for file transfers. RDP is a remote desktop protocol, and CIFS is used for sharing files and printers.

3. Which TCP/IP protocol uses port 80?

- A. HTTP
- B. HTTPS

- C. Telnet
 - D. POP3
 - **Correct Answer:** A.
 - **Explanation:** HTTP uses port 80. HTTPS uses port 443, Telnet uses port 23, and POP3 uses port 110.
4. **What is the maximum number of IPv6 addresses that can be assigned to one IPv6 interface?**
- A. One (unicast)
 - B. Two (unicast and anycast)
 - C. Three (unicast, anycast, and multicast)
 - D. None of the above
 - **Correct Answer:** D.
 - **Explanation:** An IPv6 interface is not limited in the number of addresses that can be assigned, although practical limitations may exist.
5. **Which of the following are valid examples of IPv6 addresses? (Choose all that apply.)**
- A. 2001:0db8:3c4d:0012:0000:0000:1234:56ab
 - B. ::ffff:c0a8:173
 - C. 2001:db8:3c4d:12::1234:56ab
 - D. 2001::1ab4::5468
 - **Correct Answer:** A, B, C.
 - **Explanation:** An IPv6 address contains 128 bits, written in eight 16-bit fields represented by four hexadecimal digits. Option A shows all eight fields in full. Option B is an IPv4 address expressed in IPv6 form. Option C is the same address as option A, but written in accepted shorthand. Option D is not valid because the double colons (::) can be used only once within an address.
6. **Which of the following IP addresses would not be valid for a DNS server on the Internet?**
- A. 10.25.11.33
 - B. 18.33.66.254
 - C. 155.118.63.11
 - D. 192.186.12.2
 - **Correct Answer:** A.
 - **Explanation:** On the Internet, a DNS server requires a public IP address. The address 10.25.11.33 is in a private address space, making it invalid for a DNS server on the Internet.
7. **The workstations on your network are configured to use a DHCP server. One of the workstations can't communicate with other computers. Its IP address is 169.254.1.18. What could be the problem?**
- A. The subnet mask is wrong.
 - B. It has a private IP address.
 - C. The default gateway is wrong.
 - D. It can't reach the DHCP server.
 - **Correct Answer:** D.

- **Explanation:** The address assigned to the computer (169.254.1.18) is an APIPA (Automatic Private IP Addressing) address. Microsoft client computers, and others, configure themselves with an address in this range if they are unable to reach a DHCP server.
8. **Which of the following protocols is responsible for sending email?**
- A. IMAP4
 - B. POP3
 - C. SMTP
 - D. SNMP
 - **Correct Answer:** C.
 - **Explanation:** Simple Mail Transfer Protocol (SMTP) is responsible for sending email. IMAP4 and POP3 are used for receiving email. SNMP is a network management protocol.
9. **What port does the RDP protocol work on?**
- A. 53
 - B. 143
 - C. 389
 - D. 3389
 - **Correct Answer:** D.
 - **Explanation:** Remote Desktop Protocol (RDP) works on port 3389. DNS works on port 53, IMAP4 works on port 143, and LDAP works on port 389.
10. **An email administrator wants to help protect against their server being spoofed to send spam. They were told that they can do this with a TXT record in their DNS server. If they want to authenticate emails using an encrypted security key, which TXT record would be most appropriate?**
- A. DMARC
 - B. VLAN
 - C. SPF
 - D. DKIM
 - **Correct Answer:** D.
 - **Explanation:** DKIM (DomainKeys Identified Mail) authenticates messages from email servers using private-public encrypted key pairs. SPF (Sender Policy Framework) authenticates via IP addresses. DMARC (Domain-based Message Authentication, Reporting, and Conformance) is a TXT record that allows an administrator to specify how rejected emails should be handled. VLAN is a virtual LAN and not a TXT record type.
11. **What are advantages that TCP has over UDP? (Choose two.)**
- A. Acknowledged delivery
 - B. Faster delivery
 - C. Lower overhead
 - D. Virtual circuits
 - **Correct Answer:** A, D.

- **Explanation:** TCP is a connection-oriented protocol that establishes virtual circuits and acknowledges delivery of packets. Because of these features, it has higher overhead than UDP and is a little slower.

12. **Your friend is concerned about the security of making an online purchase. What should you tell them to look for in the address bar of the web browser?**

- A. HTTP
- B. HTTPS
- C. SSH
- D. TLS
- **Correct Answer:** B.
- **Explanation:** The HTTP protocol is inherently unsecure, but the HTTPS protocol is secure. SSH and TLS are also secure, but they are not protocols used to connect to websites directly in the address bar for web browsing.

13. **You are manually configuring a TCP/IP host. Another administrator gives you the router's IP address. What is the TCP/IP term for this?**

- A. Default gateway
- B. Subnet mask
- C. DNS server
- D. DHCP server
- **Correct Answer:** A.
- **Explanation:** The router is your doorway out into other networks, and it is known in TCP/IP terms as the default gateway. Without this configuration option, you would not be able to get to external networks. The subnet mask tells a host which network it's on. The DNS server resolves hostnames to IP addresses, and a DHCP server provides IP configuration information to hosts.

14. **Your network is running IPv4. Which of the configuration options are mandatory for your host to communicate on the network? (Choose two.)**

- A. IP address
- B. Subnet mask
- C. Default gateway
- D. DNS server address
- **Correct Answer:** A, B.
- **Explanation:** The only mandatory IPv4 configuration items are an IP address and a subnet mask. If you are not connecting to another network, a default gateway is not strictly needed. DNS servers resolve hostnames to IP addresses, but they are not mandatory for basic network communication.

15. **Which of the following protocols is used for secure retrieval of email?**

- A. SMTP
- B. SNMP
- C. POP3
- D. IMAP4
- **Correct Answer:** D.

- **Explanation:** IMAP4 and POP3 are the two protocols used for email retrieval. Of the two, only IMAP4 provides security features. SMTP sends email. SNMP is a network management protocol.

16. Which of the following is the name of a secure point-to-point connection made over a public network?

- A. NAT
- B. APIPA
- C. VLAN
- D. VPN
- **Correct Answer:** D.
- **Explanation:** A virtual private network (VPN) is a secure point-to-point connection made over a public network. NAT translates private IP addresses to public IP addresses. APIPA is an automatic IP address assignment if a client computer can't reach a DHCP server. VLANs are virtual local area networks configured through switches.

17. Which network protocol is used for administration of networking devices such as routers and switches, and which port(s) does it use?

- A. SNMP, 161 and 162
- B. SNMP, 25
- C. SMTP, 25
- D. SMTP, 161 and 162
- **Correct Answer:** A.
- **Explanation:** Simple Network Management Protocol (SNMP) is used for networking device administration and management. It uses ports 161 and 162. Simple Mail Transfer Protocol (SMTP) is for sending email and uses port 25.

18. Which of the following is an IPv6 broadcast address?

- A. ::1
- B. FE80::
- C. FF00::
- D. ::FFFF
- E. None of the above
- **Correct Answer:** E.
- **Explanation:** IPv6 does not have broadcast addresses. IPv6 uses multicasts instead, which are a bit like targeted broadcasts. FF00:: is the first part of a multicast address.

19. You are setting up a small network that will not connect to the Internet. You want computers to be able to locate each other by using hostnames. What service will do this?

- A. DNS
- B. DHCP
- C. FTP
- D. APIPA
- **Correct Answer:** A.

- **Explanation:** DNS (Domain Name System) is typically known as a name resolver on the Internet, but it will also work on private networks. DNS resolves hostnames to IP addresses. DHCP automatically configures clients with IP address information. FTP is for file downloads. APIPA is a process used to assign clients a private IP address automatically when they can't reach the DHCP server.
20. Which of the following protocols is responsible for resolving IP addresses to hardware addresses?
- A. DNS
 - B. DHCP
 - C. ARP
 - D. RARP
 - **Correct Answer:** C.
 - **Explanation:** The Address Resolution Protocol (ARP) resolves IP addresses to hardware (MAC) addresses. RARP does the reverse, resolving MAC addresses to IP addresses. DNS resolves hostnames to IP addresses. DHCP automatically configures TCP/IP clients.

Chapter 7: Wireless and SOHO Networks - Review Questions

1. _____ is immune to electromagnetic or radio-frequency interference.
- A. Twisted pair cabling
 - B. CSMA/CD
 - C. Broadband coaxial cabling
 - D. Fiber-optic cabling
 - **Correct Answer:** D.
 - **Explanation:** Companies seeking to ensure the safety and integrity of their data should use fiber-optic cable because it is not affected by electromagnetic or radio-frequency interference. Even some shielded copper cables are not immune to EMI or RFI, which eliminates twisted pair and coaxial options. CSMA/CD is an access method, not a cable type.
2. Which of the following is a type of connector used with coaxial cable?
- A. RJ-11
 - B. RJ-45
 - C. F type
 - D. SC
 - **Correct Answer:** C.
 - **Explanation:** Coaxial cable can use BNC connectors and F type connectors. RJ-11 and RJ-45 are twisted pair connectors, while SC is a fiber-optic connector.
3. You need to put a connector on the end of an Ethernet crossover cable. The existing end has a white and green colored wire at pin 1. What color do you need to make pin 1 on the new end?
- A. White/green

- B. Green
- C. White/orange
- D. Orange
- **Correct Answer: C.**
- **Explanation:** A crossover cable will flip pins 1 and 3 on each end. Therefore, if the existing end has white/green at pin 1 (T568A standard), the new end needs to have the white/orange wire as pin 1 (T568B standard). The correct order for this cable should be white/orange, orange, white/green, blue, white/blue, green, white/brown, brown.

4. _____ is the type of media access method used by NICs that listen to or sense the cable to check for traffic and send only when they hear that no one else is transmitting.

- A. T568A/T568B
- B. CSMA/CD
- C. CSMA/CA
- D. Demand priority
- **Correct Answer: B.**
- **Explanation:** Carrier Sense Multiple Access with Collision Detection (CSMA/CD) specifies that the NIC pause before transmitting a packet to ensure that the line is not being used. If no activity is detected, it transmits the packet. If activity is detected, it waits until the line is clear. In the event of a collision (two NICs transmitting simultaneously), both NICs pause to detect and then retransmit the data. CSMA/CA also listens to the line but attempts to avoid collisions. T568A/T568B are twisted pair wiring standards.

5. What is the lowest grade of UTP that is rated for 100 Mbps transmission?

- A. Cat 5
- B. Cat 5e
- C. Cat 6
- D. Cat 6a
- **Correct Answer: A.**
- **Explanation:** Cat 5 was the first UTP standard ratified for 100 Mbps transmissions. Before that, Cat 3 was popular but only supported 10 Mbps. Cat 5e, Cat 6, and Cat 6a all support at least 1 Gbps and came after Cat 5.

6. A physical star topology consists of several workstations that branch off a central device called a _____.

- A. NIC
- B. Bridge
- C. Router
- D. Hub
- **Correct Answer: D.**
- **Explanation:** A hub or a switch is at the center of a star topology. A NIC (Network Interface Card) is a network card that each computer needs to be on the network. Bridges and routers are higher-level connectivity devices that connect network segments or separate networks together.

7. **Of all the network cabling options, _____ offers the longest possible segment length.**
- A. Unshielded twisted pair
 - B. Coaxial
 - C. Fiber-optic
 - D. Shielded twisted pair
 - **Correct Answer: C.**
 - **Explanation:** Fiber-optic cable can span distances of several kilometers because it has much lower attenuation, crosstalk, and interference compared to copper cables.
8. **What devices transfer packets across multiple networks and use tables to store network addresses to determine the best destination?**
- A. Routers
 - B. Firewalls
 - C. Hubs
 - D. Switches
 - **Correct Answer: A.**
 - **Explanation:** Routers are designed to route (transfer) packets across networks. They determine the best path based on the internal routing tables they maintain.
9. **Which of the following networking hardware devices is capable of creating VLANs?**
- A. Firewall
 - B. Patch panel
 - C. Unmanaged switch
 - D. Managed switch
 - **Correct Answer: D.**
 - **Explanation:** A managed switch can create virtual LANs (VLANs) using its management software. A firewall is a security device. Patch panels and unmanaged switches cannot create VLANs.
10. **Which of the following wireless communication standards is often described in terms of a wireless personal area network?**
- A. Bluetooth
 - B. Infrared
 - C. Cellular
 - D. Ethernet
 - **Correct Answer: A.**
 - **Explanation:** Bluetooth networks are often called wireless personal area networks (WPANs).
11. **Your ISP has just finished running fiber-optic cable in your neighborhood, and you want to switch from cable Internet to a faster fiber-optic connection. Which of the following statements is true about how you will get an Internet connection?**
- A. You will continue to use your cable modem.
 - B. You need to switch to using a DSL modem.
 - C. You need to switch to using an ONT.

- D. You need to switch to using PoE.
- **Correct Answer: C.**
- **Explanation:** Fiber-optic Internet connections use an optical network terminal (ONT) to terminate the fiber and translate it into a digital connection over copper cable inside your home. Cable modems and DSL modems connect copper to copper. PoE (Power over Ethernet) is not relevant in this situation.

12. If you are going to run a network cable in the space above the drop ceiling in your office, which type of cable should you use?

- A. Plenum
- B. PVC
- C. Coaxial
- D. Fiber-optic
- **Correct Answer: A.**
- **Explanation:** For areas where a cable must be fire retardant, such as in a drop ceiling (plenum spaces), you must run plenum-grade cable. Plenum refers to the coating on the sleeve of the cable. PVC is another type of coating but produces poisonous gas when burned.

13. Which of the following connector types is an MFF connector?

- A. BNC
- B. ST
- C. SC
- D. LC
- **Correct Answer: D.**
- **Explanation:** The Lucent connector (LC), sometimes also called a local connector, is a mini form factor (MFF) fiber-optic connector. BNC is a coaxial connector. ST and SC are other fiber-optic connectors.

14. What Ethernet specification would you be running if you needed to make a connection of 10 Gbps over a distance of 5 kilometers?

- A. 10GBaseER
- B. 10GBaseT
- C. 10GBaseSR
- D. 10GBaseLR
- **Correct Answer: A.**
- **Explanation:** To make a connection that is 5 kilometers long at 10 Gbps, you are limited to fiber-optic cable, specifically single-mode fiber (SMF). 10GBaseER is one of two common SMF standards for extended distances (the E indicates extended). A T designation in an Ethernet standard refers to twisted pair. SR and LR are fiber standards but do not stretch for 5 kilometers.

15. Which of the following are advantages to using a SAN? (Choose two.)

- A. More storage space on the network
- B. More efficient data storage
- C. Faster data access
- D. Automated data backups
- **Correct Answer: B, C.**

- **Explanation:** Storage Area Networks (SANs) offer advantages including block-level data storage, which is more efficient, and they provide faster data access. They also reduce network loads and are easily expandable. They do not inherently provide more storage space or automated data backups.
16. **You are installing a network at a friend's house, and it's impossible to run a network cable from one point in the house to another. Your friend does not want to use wireless networking. Which of the following is the best option to get network connectivity between the two points?**
- A. Power over Ethernet injector
 - B. Power over Ethernet switch
 - C. Ethernet over Power
 - D. Router
 - **Correct Answer:** C.
 - **Explanation:** Ethernet over Power can transmit network signals over power lines within a closed circuit, such as a house. PoE (Power over Ethernet) devices provide power to devices via Ethernet but don't create network connectivity over power lines. A router is for connecting network segments.
17. **What type of device will block unwanted traffic from your network using a set of rules called an ACL?**
- A. Router
 - B. Firewall
 - C. Switch
 - D. NAS
 - **Correct Answer:** B.
 - **Explanation:** The job of a firewall is to block unwanted network traffic. Firewalls achieve this by using a list of rules known as an access control list (ACL). Routers connect networks, and switches are central connectivity points. A NAS (Network Attached Storage) device is like a dedicated file server.
18. **What type of coaxial cable is recommended for digital television cable signals?**
- A. RG-6
 - B. RG-8
 - C. RG-58
 - D. RG-59
 - **Correct Answer:** A.
 - **Explanation:** The two RG standards used for cable television are RG-6 and RG-59. Of the two, RG-6 is better because it can run longer distances and handle digital signals. RG-59 is primarily for analog signals. RG-8 is thicknet coax, and RG-58 is thinnet coax.
19. **Which of the following devices works with MAC addresses to determine what to do with network traffic?**
- A. Hub
 - B. Router
 - C. Patch panel
 - D. Switch

- **Correct Answer:** D.
- **Explanation:** A switch is a Layer 2 device. Therefore, it works with hardware (MAC) addresses to determine where to forward network traffic. Hubs and patch panels work at Layer 1 and deal with bits, while routers work at Layer 3 and use logical IP addresses.

20. Transmitting at 10 Gbps, how far can signals on an MMF cable travel?

- A. 100 meters
- B. 550 meters
- C. 1 kilometer
- D. 40 kilometers
- **Correct Answer:** B.
- **Explanation:** Multimode fiber (MMF) can transmit up to 550 meters at 10 Gbps, depending on the Ethernet specification. Other standards using MMF might transmit up to 300 meters. If you need to transmit up to 40 kilometers, you must use single-mode fiber (SMF).

Chapter 8: Network Services, Virtualization, and Cloud Computing - Review Questions

1. **Your company hosts its own web server, and it allows consumers to make purchases via the server. The help line has been getting complaints that users are unable to access the website. You open the site from an internal workstation and it seems fine. What is the most likely cause?**
 - A. The firewall is blocking TCP port 23.
 - B. The firewall is blocking TCP port 443.
 - C. The security module of the web server is malfunctioning.
 - D. The web server is down.
 - **Correct Answer:** B.
 - **Explanation:** Consumers access web servers using HTTP (port 80) or HTTPS (port 443). Since the website is for purchases, it uses HTTPS (secure HTTP), which operates on TCP port 443. If users are unable to access the website from outside, but it works internally, a firewall blocking TCP port 443 is the most likely cause. Port 23 is for Telnet.
2. **Your manager wants you to install a networked Internet appliance that prevents network traffic-based attacks and includes antimalware and antispyware software. What should you install?**
 - A. Spam gateway
 - B. Load balancer
 - C. UTM
 - D. Proxy server
 - **Correct Answer:** C.

- **Explanation:** The manager is looking for a Unified Threat Management (UTM) device, which is designed to be a one-stop network protection solution, preventing network traffic-based attacks and including antimalware and antispyware software. A spam gateway specifically helps with spam email but not other malware. A load balancer distributes work among multiple servers. A proxy server fulfills client requests, including blocking objectionable content.
3. **You are installing a file server for the accounting department. Where should this file server be located on the network?**
- A. Outside of the firewall
 - B. In the screened subnet
 - C. In the secure network
 - D. On the router
 - **Correct Answer:** C.
 - **Explanation:** If the data on the server does not need to be accessed via the Internet, the server should be in the most secure place possible, which is inside the firewall(s) in the secure network. Placing it outside the firewall or in a screened subnet (DMZ) would expose it more to external threats, and a router is a connectivity device, not a location for a file server.
4. **You have been asked to identify the right type of cloud service to help the team of developers to provide programming elements such as runtime environments. Which service do you recommend?**
- A. PaaS
 - B. IaaS
 - C. SaaS
 - D. DaaS
 - **Correct Answer:** A.
 - **Explanation:** Platform as a Service (PaaS) provides infrastructure (like IaaS) and also supplies needed programming elements such as runtime environments, making it suitable for a development team. Infrastructure as a Service (IaaS) provides only the basic infrastructure (hardware as a service). Software as a Service (SaaS) provides applications directly to users. DaaS is not a current exam objective.
5. **Which of the following are services that a print server should provide? (Choose two.)**
- A. Accepting print jobs from clients
 - B. Turning off printers on demand
 - C. Providing clients with the appropriate printer driver during installation
 - D. Notifying users when the print job is complete
 - **Correct Answer:** A, C.
 - **Explanation:** Print servers should make printers available to clients and accept print jobs. They also process and manage print jobs (in the print queue) and provide client computers with the right print drivers when clients attempt to install the printer. Print servers do not turn printers off on demand or inherently provide notifications when a job has printed.

6. **You are setting up a cloud contract with a provider. Your team needs the ability to quickly increase capacity to meet peak demands. What do you request?**
- A. Rapid elasticity
 - B. High availability
 - C. Resource pooling
 - D. Metered utilization
 - **Correct Answer:** A.
 - **Explanation:** The ability to quickly expand services (increase capacity) as needed is known as rapid elasticity. High availability refers to guaranteed uptime. Resource pooling is the concept that the provider's resources are shared among clients. Metered utilisation is how cloud providers track and charge for usage.
7. **Which type of server is responsible for preventing users from accessing websites with objectionable content?**
- A. Proxy
 - B. Web
 - C. DHCP
 - D. DNS
 - **Correct Answer:** A.
 - **Explanation:** A proxy server can be configured to block access to websites that contain potentially dangerous or inflammatory material. Web servers host web pages. DHCP servers provide IP configuration information. DNS servers resolve hostnames to IP addresses.
8. **Your company wants to move to a cloud provider to be able to scale resources quickly, but it is concerned about the security of confidential information. Which of the following types of cloud models might be the most appropriate for your company?**
- A. Public
 - B. Private
 - C. Community
 - D. Hybrid
 - **Correct Answer:** D.
 - **Explanation:** A hybrid cloud provides the best of public and private clouds, offering the scalability and cost-effectiveness of a public cloud combined with the enhanced security needed for important files on the private portion of the cloud.
9. **What does a DHCP server need to be configured with to operate properly?**
- A. DNS server
 - B. Scope
 - C. Range
 - D. DHCP relay agent
 - **Correct Answer:** B.
 - **Explanation:** Every DHCP server needs to have a scope, which is the range of addresses available to clients, as well as other options it can provide. A DHCP server can optionally provide clients with the address of a DNS server. There is

no DHCP range, though the scope defines a range. A DHCP relay agent is a separate system that relays DHCP requests.

10. **You have been asked to advise a group of several universities that want to combine research efforts and store data in the cloud. Which type of cloud solution might be best for them?**

- A. Public
- B. Private
- C. Community
- D. Hybrid
- **Correct Answer:** C.
- **Explanation:** A community cloud is a cloud infrastructure shared by several organizations that have shared concerns (e.g., mission, security requirements, policy, and compliance considerations). This would be ideal for universities combining research efforts.

11. **When configuring a DNS server, administrators must create which of the following?**

- A. Zone file
- B. Hosts file
- C. Scope file
- D. DNS proxy
- **Correct Answer:** A.
- **Explanation:** When configuring a DNS server, administrators must create a zone file to store the mappings between hostnames and IP addresses. A hosts file is a local text file that maps hostnames to IP addresses, used before DNS was prevalent. A scope file is related to DHCP, not DNS. There is no "DNS proxy" in this context as a configuration item.

12. **Your manager wants to use the cloud because everyone seems to be talking about it. What should you include when you are listing the benefits of using the cloud? (Choose all that apply.)**

- A. Increased security
- B. Increased scalability
- C. Lower cost
- D. Improved reliability
- **Correct Answer:** B, C, D.
- **Explanation:** Cloud solutions are great for enhancing scalability, reliability, and generally lowering costs. Security could be a concern with cloud computing depending on the organization's needs, as resources are not always locally controlled and managed.

13. **You are configuring two email servers on your company's network. Which network protocol do the servers use to transfer mail to each other?**

- A. POP3
- B. IMAP4
- C. SNMP
- D. SMTP

- **Correct Answer:** D.
- **Explanation:** Simple Mail Transfer Protocol (SMTP) is used to transfer (send) email between servers. POP3 (Post Office Protocol 3) and IMAP4 (Internet Message Access Protocol 4) are used by clients to retrieve (receive) email from a mail server. SNMP (Simple Network Management Protocol) is for network device administration and management.

14. **You have been asked to configure a client-side virtualization solution with three guest OSs. Each one needs Internet access. How should you configure the solution in the most cost-effective way?**

- A. Three physical NICs
- B. One physical NIC, three virtual NICs, and one virtual switch
- C. One physical NIC, one virtual NIC, and three virtual switches
- D. One physical NIC, three virtual NIC, and three virtual switches
- **Correct Answer:** B.
- **Explanation:** Each virtual machine will use its own virtual NIC, so you need three virtual NICs. The virtual NICs will communicate with one virtual switch managed by the hypervisor. The virtual switch will then communicate with one physical NIC on the host system to access the physical network and the Internet. This is the most cost-effective solution compared to installing multiple physical NICs.

15. **You have five web servers that manage requests for online purchases. An administrator notices that one of the servers is always busy while another is idle, and the company is getting some online complaints about the slow website. Which of the following servers will help fix this?**

- A. DNS
- B. DHCP
- C. Proxy
- D. Load balancer
- **Correct Answer:** D.
- **Explanation:** A load balancer is designed to spread the work around to multiple servers, accepting inbound requests and sending them to the most appropriate (least busy) server. This would address the issue of some servers being idle while others are busy and improve website performance.

16. **You have been asked to install Linux in a VM on a Windows 10 client. The Windows 10 client needs 4 GB of RAM, and Linux needs 2 GB of RAM. How much RAM does the system need at a minimum?**

- A. 4 GB
- B. 6 GB
- C. 8 GB
- D. Unable to determine from the question
- **Correct Answer:** B.
- **Explanation:** The system needs enough RAM to support both the host OS (Windows 10, 4 GB) and the guest OS (Linux, 2 GB) simultaneously. Therefore, the minimum amount of RAM required is 6 GB (4 GB + 2 GB). More RAM is always better for virtualization.

17. A computer using which of the following would be considered a legacy device?

(Choose all that apply.)

- ☐ A. A 386 processor
- ☐ B. The IPX/SPX protocol
- ☐ C. An application developed in 1983
- ☐ D. 1 GB of RAM
- ☐ **Correct Answer:** A, B, C.
- ☐ **Explanation:** Legacy systems are ones that use older hardware (like a 386 processor), older software (like an application from 1983), or network protocols that are not commonly used today (like IPX/SPX). While 1 GB of RAM might be underpowered for modern systems, it doesn't automatically classify a system as "legacy" in the same way as the other options.

18. You have been asked to set up client-side virtualization on an office computer. The host OS is Windows 10, and there will be three Windows 10 guest OSs. Which of the following is true about the need for antivirus security?

- ☐ A. The host OS needs an antivirus program, but virtual machines can't be affected by viruses.
- ☐ B. The host OS antivirus software will also protect the guest OSs on the VMs.
- ☐ C. Installing antivirus software on the virtual switch will protect all guest OSs.
- ☐ D. The host OS and each guest OS need their own antivirus software installed.
- ☐ **Correct Answer:** D.
- ☐ **Explanation:** Each instance of the operating system you are running, including both the host OS and each individual guest OS in a virtual machine, requires its own security software (e.g., antivirus program). Virtual machines are not immune to viruses.

19. You need to set up a temporary operating system environment to quickly test a piece of software your manager wants to install on the network. Which should you use?

- ☐ A. AAA server
- ☐ B. Sandbox
- ☐ C. SCADA
- ☐ D. Application virtualization
- ☐ **Correct Answer:** B.
- ☐ **Explanation:** A sandbox is a temporary operating system environment ideal for testing software, like a "lite" version of a virtual machine. An AAA server is for authentication, authorization, and accounting. SCADA is a legacy industrial control system. Application virtualization is used for legacy apps or cross-platform virtualization, but a sandbox is more specifically for temporary testing environments.

20. You have been asked to set up client-side virtualization on a computer at work. The manager asks for a Type 2 hypervisor. What is the disadvantage of using that type of hypervisor?

- ☐ A. VMs will compete for resources with the host OS.
- ☐ B. The amount of resources available to a guest OS cannot be configured.

- C. Virtual OSs cannot get on the physical network.
- D. The host OS cannot be managed.
- **Correct Answer:** A.
- **Explanation:** A Type 2 hypervisor sits on top of an existing host OS. This means that OSs installed in VMs will compete for resources with the host OS, which can lead to performance degradation if resources are not managed properly. The amount of resources allocated to a guest OS can be configured. Virtual OSs can get on the physical network if configured correctly. The host OS can still be managed normally.

Chapter 9: Laptop and Mobile Device Hardware

1. **A client has a laptop with which you are unfamiliar. You are asked to perform a memory upgrade. How can you obtain the service manual for this laptop computer?**
 - A. By pressing F1 while in Windows
 - B. By pressing F2 while the system is booting up
 - C. By reading the paper copy that comes with the laptop
 - D. By searching the manufacturer's website
 - **Correct Answer:** D.
 - **Explanation:** Laptop service manuals can be obtained from the manufacturer's website. It's very rare that paper service manuals are shipped with the laptop. Pressing F1 while in Windows will open Windows Help, and pressing F2 on many laptops during the system boot will take you into the BIOS/UEFI.
2. **Your manager tells you to replace the inverter on a broken laptop. Where will you find this component?**
 - A. Underneath the keyboard
 - B. In the display
 - C. Next to the heat sink and fan
 - D. Near the CPU
 - **Correct Answer:** B.
 - **Explanation:** The inverter is a component of a laptop display.
3. **You need to replace an LCD on a defective laptop. Which of the following are components of an LCD? (Choose all that apply.)**
 - A. Inverter
 - B. Screen
 - C. Wi-Fi card
 - D. Backdrop
 - **Correct Answer:** A, B.
 - **Explanation:** LCD components include the screen and the inverter.

4. **A user complains that their mouse cursor randomly jumps to different places on the screen when they type. Which device might you want to disable to prevent this from happening?**
- A. Touchpad
 - B. Mouse
 - C. Point stick
 - D. Trackball
 - **Correct Answer: A.**
 - **Explanation:** If the mouse cursor jumps randomly while typing, it is likely due to an inadvertent touch on the touchpad; disabling it can prevent this.
5. **One of the users on your network needs to travel and wants to work on the airplane. Which laptop accessory will allow them to power their laptop from the airplane?**
- A. AC adapter
 - B. DC adapter
 - C. Battery converter
 - D. Airplane mode
 - **Correct Answer: B.**
 - **Explanation:** A DC adapter converts the DC output from a car or airplane accessory power plug into the DC voltages required by your laptop. An AC adapter is used with standard wall electrical outlets.
6. **You need to replace defective DDR4 memory in a laptop. How many pins will the replacement memory module have?**
- A. 200
 - B. 204
 - C. 260
 - D. 288
 - **Correct Answer: C.**
 - **Explanation:** DDR4 SODIMMs have 260 pins. DDR2 SODIMMs have 200 pins, DDR3 SODIMMs have 204 pins, and DDR5 has 262 pins. 288 pins are found on DDR4 DIMMs, which are used in desktops, not laptops.
7. **A user complains that their 2-in-1 laptop screen does not properly detect where they place their finger on the screen. What should you do first to resolve the issue?**
- A. Replace the touch screen
 - B. Replace the touchpad
 - C. Recalibrate the touch screen
 - D. Recalibrate the touchpad
 - E. Degauss the touch screen
 - F. Degauss the touchpad
 - **Correct Answer: C.**
 - **Explanation:** If the touchscreen is not responding properly, the first step is to recalibrate it. If problems persist, the screen may need replacement. Degaussing is for old CRT monitors.

8. You need to wirelessly connect two accessories to a smartphone. Which of the following could be valid options to connect these wireless accessories? (Choose two.)
- A. USB
 - B. Lightning
 - C. NFC
 - D. Bluetooth
 - **Correct Answer:** C, D.
 - **Explanation:** NFC and Bluetooth are two wireless connectivity options for mobile devices. USB and Lightning are wired connectivity methods.
9. There has recently been a string of hardware thefts in your office building. What should you recommend that your users do to help avoid this problem?
- A. Enable GPS tracking
 - B. Use a docking station
 - C. Use a cable lock
 - D. Use the screensaver lock
 - **Correct Answer:** C.
 - **Explanation:** To prevent physical theft, laptops can be secured with cable locks that attach to a desk or workstation. GPS tracking helps after theft, and docking stations or screensaver locks do not prevent physical theft.
10. Which of the following describes the job of an inverter in a laptop?
- A. It changes the screen orientation when the laptop is rotated.
 - B. It converts AC power into DC power for the display backlight.
 - C. It converts DC power into AC power for the display backlight.
 - D. It allows the laptop display to function in tablet mode.
 - **Correct Answer:** C.
 - **Explanation:** An inverter in a laptop converts DC power into AC power to supply the display backlight.
11. A user is getting a new laptop. Which of the following is not a valid option to get the user's files and data from the old hard drive to the new hard drive?
- A. Manually copy files from the old drive to the cloud, and then to the new drive
 - B. Manually copy files from the old drive to an external hard drive, and then to the new drive
 - C. Use a hard drive migration app
 - D. Use the NFC disk transfer utility
 - **Correct Answer:** D.
 - **Explanation:** Data migration can be done by manually copying files (to cloud or external drive) or using migration software. There is no NFC disk transfer utility.
12. A user on your network wants to be able to draw images on a screen and have the laptop capture them. What type of device needs to be installed on the user's laptop?
- A. Inverter
 - B. Capturer
 - C. Digitizer

- D. Touchpad
 - **Correct Answer: C.**
 - **Explanation:** A digitizer is needed to convert input like drawn images into electronic images on the computer. A touchscreen can also serve this purpose.
13. **A user has requested a laptop memory upgrade. The technician attempts to put in new memory, but the memory module is a bit too wide for the slot. What is the most likely scenario?**
- A. The technician is trying to install DDR4 into a motherboard with DDR3 slots.
 - B. The technician is trying to install DDR3 into a motherboard with DDR4 slots.
 - C. The technician is trying to install MicroDIMMs into SODIMM slots.
 - D. The technician is trying to install DIMMs into SODIMM slots.
 - **Correct Answer: D.**
 - **Explanation:** Laptops use SODIMMs, which are much smaller than standard DIMMs used in desktops. Trying to install a desktop DIMM into a laptop SODIMM slot would result in it being too wide.
14. **You have a user who needs to keep desktop devices such as keyboard, monitor, and mouse permanently connected so that they can be used by an attached laptop. What type of device do you recommend that they use?**
- A. Docking station
 - B. Keyboard, video, mouse (KVM) switch
 - C. Input/output virtual server
 - D. USB hub
 - **Correct Answer: A.**
 - **Explanation:** A docking station is designed to allow a laptop to connect to and use desktop components (keyboard, monitor, mouse, etc.) permanently, providing convenience when portability is not needed.
15. **The process by which the processor slows down to conserve power is officially called _____.**
- A. Underclocking
 - B. Cooling
 - C. Disengaging
 - D. Throttling
 - **Correct Answer: D.**
 - **Explanation:** The process of a processor slowing down to conserve power or manage heat is called throttling.
16. **You need to replace a failed AC adapter for a client's laptop. When replacing the adapter, which of the following purchases is acceptable to obtain the same or better results?**
- A. An AC adapter with a higher voltage rating than the original
 - B. An AC adapter with a higher wattage rating than the original
 - C. A DC adapter with the same voltage rating as the original
 - D. An AC adapter with a lower voltage and wattage rating than the original
 - **Correct Answer: B.**

- **Explanation:** When replacing an AC adapter, you should choose one rated for the same or higher wattage than the original. The voltage and polarity must match exactly.
17. **What should you do for a Li-ion battery that appears to charge fully but does not last as long as the battery's meter indicates that it will last?**
- A. Replace the battery
 - B. Exercise the battery
 - C. Calibrate the battery
 - D. Short the terminals to discharge the battery
 - **Correct Answer:** C.
 - **Explanation:** For a Li-ion battery that charges fully but doesn't last as long as indicated, battery calibration is recommended. Exercising is for nickel-based batteries, and shorting terminals is dangerous. Replacement is a last resort.
18. **You are giving a seminar to new technicians on replacing laptop hard drives. A student asks how laptop hard drives differ from desktop hard drives. What do you tell them?**
- A. Laptop hard drives use different drive technologies than their desktop counterparts.
 - B. Laptop hard drives have separate power connectors.
 - C. Laptop hard drives are larger than desktop hard drives.
 - D. Laptop hard drives commonly have a 2.5" form factor.
 - **Correct Answer:** D.
 - **Explanation:** Laptop hard drives commonly have a 2.5" form factor, while desktop hard drives are usually 3.5". Laptop hard drives use the same drive technologies (e.g., SATA) as desktops and do not have separate power connectors.
19. **A client has a Bluetooth-enabled mobile phone but a laptop that is not Bluetooth-enabled. They want to use a Bluetooth headset with their laptop. Which of the following is the easiest solution to enable Bluetooth on the laptop?**
- A. Buy a Wi-Fi-compatible headset
 - B. Buy a USB Bluetooth adapter
 - C. Buy a Mini PCIe Bluetooth adapter
 - D. Replace the laptop
 - **Correct Answer:** B.
 - **Explanation:** The easiest solution is to buy a USB Bluetooth adapter, as it provides Bluetooth functionality externally without needing to open the laptop case.
20. **A user wants their laptop to have a full-sized optical drive and external hard drive. Which of the following accessories is most likely to have full-sized bays for these devices?**
- A. Laptop base
 - B. Port replicator
 - C. Docking station
 - D. Mini PCIe dock

- **Correct Answer:** C.
- **Explanation:** A docking station is specifically designed to provide full-sized bays and connections for external peripherals, including optical drives and hard drives, that a laptop might lack. Port replicators offer fewer expansion slots.

Chapter 10: Mobile Connectivity and Application Support

1. **You have a friend who asks you why she would ever disable cellular data networking. Which of the following is not a valid reason to disable cellular data networking?**
 - A. You have a limited amount of data in your monthly plan.
 - B. You have access to a reliable Wi-Fi signal.
 - C. You are about to download an update to your phone.
 - D. Your phone calls are going out over your carrier's cellular network.
 - **Correct Answer:** D.
 - **Explanation:** Whenever you have a reliable Wi-Fi signal available, which you do not pay for "as you go," you should feel free to disable your cellular access to data networking. The wireless network is often faster and does not cost you anything to use. If data networking works better when you leave the cellular network available as a fallback, you can choose to disable it only for certain large downloads or disable it completely until the download is complete. Phone calls will continue to be sent over the cellular network. This does not imply that your data is not using an available Wi-Fi connection. Therefore, unless you are particularly sensitive to the situation or know that data is going out over your cell access, you might not need to disable the cellular data-networking feature.
2. **You need to pair two Bluetooth devices with each other. Which of the following is true regarding Bluetooth pairing?**
 - A. Bluetooth connections support wireless device control but not file transfers.
 - B. Bluetooth is not yet a fully standardized protocol.
 - C. Bluetooth connections do not reach as far as Wi-Fi connections.
 - D. You must reboot the paired devices to complete the connection.
 - **Correct Answer:** C.
 - **Explanation:** Bluetooth connections are short range, whereas Wi-Fi can extend for hundreds of meters. Bluetooth is a standardized protocol. Bluetooth connections can support file transfers and device control. You do not need to reboot paired devices to complete the connection.
3. **A technician is configuring a mobile client to use email through an ISP. Which port number should they configure to use SMTP?**
 - A. 25
 - B. 110
 - C. 143
 - D. 995
 - **Correct Answer:** A.

- **Explanation:** Simple Mail Transfer Protocol (SMTP) uses port 25. Port 110 is for POP3, 143 is for IMAP4, and 995 is for POP3 with SSL/TLS.
- 4. **You need to configure email for a mobile client. Their device has a setting referring to port 587. Which mail protocol is likely using this protocol?**
 - A. SMTP with SSL
 - B. SMTP with TLS
 - C. IMAP4 with SSL/TLS
 - D. POP3 with SSL/TLS
 - **Correct Answer:** B.
 - **Explanation:** SMTP with TLS uses port 587. SMTP with SSL uses port 465, IMAP with SSL/TLS uses port 993, and POP with SSL/TLS uses port 995.
- 5. **You are enabling email on a mobile client. Which of the following is not a standard integrated commercial provider for email?**
 - A. iCloud
 - B. Hotmail
 - C. Yahoo Mail
 - D. Exchange Online
 - **Correct Answer:** B.
 - **Explanation:** Four commercial email providers to be familiar with are iCloud, Google/Inbox, Exchange Online, and Yahoo Mail. Hotmail used to be a commercial email provider, but it no longer exists; it's now part of Outlook.com.
- 6. **If a user wanted to disable Location Services on an iPhone, where would they do that?**
 - A. Settings > Location Services
 - B. Settings > Communications
 - C. Settings > Privacy
 - D. Settings > GPS
 - **Correct Answer:** C.
 - **Explanation:** In iOS (at least through iOS 15.3.1), Location Services are under Settings > Privacy. There are no Location Services, Communications, or GPS sections directly in Settings.
- 7. **A mobile device is having intermittent communications issues. Which software component of a mobile phone is most likely responsible for these issues?**
 - A. Either iOS or Android OS
 - B. SIM OS
 - C. Baseband OS
 - D. Wireless OS
 - **Correct Answer:** C.
 - **Explanation:** Each mobile phone has a separate processor that manages wireless communications, also known as radio communications or baseband.
- 8. **An administrator needs to be able to control which apps are installed on the corporate network's mobile devices, and update or delete them and their data as necessary. Which type of service do they need?**
 - A. MAM

- B. MDM
- C. Location services
- D. Device synchronization
- **Correct Answer: A.**
- **Explanation:** Mobile application management (MAM) is used for managing corporate applications on mobile devices. Mobile device management (MDM) is primarily used to determine which mobile devices are allowed on a network and to set policies for access, and to remotely lock and wipe devices. Location services determine the location of the device. Device synchronization ensures data is saved to a secure or permanent location.

9. **You need to synchronize Windows desktop settings between two laptop computers. Which service is designed to do this?**

- A. Microsoft 365
- B. MAM
- C. MDM
- D. ActiveSync
- **Correct Answer: A.**
- **Explanation:** Microsoft 365 is able to sync desktop settings between multiple Windows-based computers. ActiveSync is for syncing mobile devices with an Exchange email server. Mobile application management (MAM) and mobile device management (MDM) are for managing apps and network access for mobile devices.

10. **You are pairing a Bluetooth headset to a mobile device. On the mobile device, after finding the device for pairing, what is the next step to take?**

- A. Enable Bluetooth
- B. Test connectivity
- C. Enter the appropriate PIN code
- D. Enable pairing
- **Correct Answer: C.**
- **Explanation:** The steps for Bluetooth pairing are: enable Bluetooth, enable pairing, find a device for pairing, enter the appropriate PIN code, and test connectivity. Therefore, the next step after finding a device is to enter the PIN code.

11. **Which of the following are universally common items that are synced between a mobile device and a larger computer? (Choose all that apply.)**

- A. Office documents
- B. Contacts
- C. Operating system files
- D. Calendar
- E. Configuration settings
- F. Apps
- **Correct Answer: B, D, F.**

- **Explanation:** Common items available for synchronization include contacts, applications, email, pictures, music, videos, calendars, bookmarks, documents, location data, social media data, e-books, and passwords.

12. Which of the following location services typically provides the best accuracy when detecting a user's location?

- A. Cellular
- B. GPS
- C. MAM
- D. MDM
- **Correct Answer:** B.
- **Explanation:** GPS is generally more accurate than cellular when determining location. MAM and MDM are mobile device management concepts, not location services.

13. Which of the following statements about configuring email access on a mobile device is true?

- A. Most Internet mail services offer an Exchange option.
- B. The TCP ports used for configuring access are usually standard port numbers.
- C. Most ports used for access are UDP ports.
- D. You must download third-party apps for connecting to email services.
- **Correct Answer:** B.
- **Explanation:** Mail access uses standard secure or unsecure TCP ports, not UDP ports. Exchange access to such mail services is not unheard of, but it is exceedingly rare. Mobile devices tend to have email clients built in.

14. Which of the following are disabled on an Android device when airplane mode is switched on? (Choose all that apply.)

- A. Cellular
- B. Wi-Fi
- C. Bluetooth
- D. Settings app
- E. Lock screen
- **Correct Answer:** A, B, C.
- **Explanation:** On an Android phone, airplane mode disables all radio communications, including cellular, Wi-Fi, and Bluetooth (and NFC as well). It does not affect the opening of any other apps or the lock screen. In recent versions of iOS, Bluetooth is not affected by airplane mode.

15. You need to enable clients to synchronize their mobile devices to their laptops. Which of the following are common connection types to enable laptop synchronization? (Choose all that apply.)

- A. Cellular
- B. Bluetooth
- C. Wi-Fi
- D. USB
- E. Tethering
- **Correct Answer:** A, C, D.

- **Explanation:** Three common connection types for synchronization to a desktop (or laptop) are cellular, Wi-Fi, and USB. Bluetooth is not used for desktop synchronization. Tethering is when a laptop or other device is granted cellular network access by connecting to a mobile device, such as a smartphone.
16. **You connect two Bluetooth devices together that have been previously connected. What is the process called that each device uses to verify the other's identity?**
- A. MAM
 - B. Synchronization
 - C. Mutual authentication
 - D. Pairing
 - **Correct Answer: C.**
 - **Explanation:** The devices verify each other's identity via mutual authentication. Pairing is done for the initial connection. MAM is mobile application management. Synchronization is used between a mobile device and a desktop/laptop or the cloud.
17. **Which of the following most accurately describes what a PRL is?**
- A. The list of cell phone towers a mobile device should connect with while roaming
 - B. The description of the user and mobile network
 - C. The mobile carrier code
 - D. The configuration settings of the network the mobile device is on
 - **Correct Answer: A.**
 - **Explanation:** The preferred roaming list (PRL) is the list of cell towers a mobile device should connect to while roaming. It is not a description of the user and network, a carrier code, or the configuration settings of the network.
18. **A network administrator wants to be able to remotely wipe everything off of corporate smartphones if they are lost or stolen. What type of service do they need?**
- A. MAM
 - B. MDM
 - C. Two-factor authentication
 - D. Location services
 - **Correct Answer: B.**
 - **Explanation:** Mobile device management (MDM) is a type of service that allows network administrators to specify which mobile devices can join the network. It also gives administrators the ability to remotely lock and completely wipe mobile devices. Mobile application management (MAM) lets an administrator control the corporate apps on a mobile device. Two-factor authentication is a security concept. Location services can help find a mobile device, but not remotely wipe it.
19. **A user needs to synchronize their iPhone to another platform. Which two options are the default ones for them to choose? (Choose two.)**
- A. Google Drive
 - B. SharePoint

- C. iCloud
 - D. iTunes
 - **Correct Answer:** C, D.
 - **Explanation:** Apple devices natively sync with iCloud and iTunes. Android devices sync with Google Drive. SharePoint is a Microsoft service that can be used to share files.
20. **A mobile user is having cellular connectivity problems when roaming but not when near their home. They are told by their carrier that they need to update their settings. Which of the following settings do they most likely need to update?**
- A. PRI
 - B. PRL
 - C. Baseband
 - D. IMEI
 - **Correct Answer:** B.
 - **Explanation:** When roaming, the mobile device uses the preferred roaming list (PRL) to connect to the proper cell phone tower. The product release instruction (PRI) contains settings for configuration items on the device that are specific to the network that it's on. Baseband refers to all wireless communications. The international mobile equipment identity (IMEI) is a 15-digit serial number that is unique to each phone and is not relevant to this issue.

Chapter 11: Troubleshooting Methodology and Resolving Core Hardware Problems

1. **Which computer component contains all the circuitry necessary for other components or devices to communicate with one another?**
 - A. Motherboard
 - B. CPU
 - C. RAM
 - D. Expansion bus
 - **Correct Answer:** A.
 - **Explanation:** The spine of the computer is the system board, otherwise known as the motherboard. All other computer components plug into the motherboard. On the motherboard, you will find the CPU, underlying circuitry, expansion slots, RAM slots, and various other chips.
2. **You are told by a technician over the phone that you need to bring replacement DDR4 SDRAM memory. What type of packaging is used for DDR4 SDRAM memory?**
 - A. 224-pin DIMM
 - B. 240-pin DIMM
 - C. 288-pin DIMM
 - D. 296-pin DIMM
 - **Correct Answer:** C.

- **Explanation:** DDR4 SDRAM is manufactured on a 288-pin DIMM, as is DDR5 (although the two are keyed differently and are not compatible). DIMMs with 224 pins and 296 pins do not exist. DIMMs with 240 pins are used for DDR2 and DDR3 SDRAM.
3. **You are identifying the problem while troubleshooting a network issue. Which of the following are proper steps to help identify the problem? (Choose all that apply.)**
- A. Inquire regarding infrastructure changes.
 - B. Conduct internal or external research based on symptoms.
 - C. Refer to the vendor's instructions for guidance.
 - D. Determine the next steps to resolve the problem.
 - E. Gather information from the user and identify user changes to the computer.
 - **Correct Answer:** A, E.
 - **Explanation:** The two sub-steps to identify the problem are: gather information from the user and identify user changes to the computer, and inquire regarding environmental or infrastructure changes. Conducting internal or external research is part of establishing a theory of probable cause. Referring to the vendor's instructions for guidance is part of establishing a plan of action to resolve the problem. Determining the next steps to resolve the problem is part of testing the theory to determine the cause.
4. **A field technician reports back that the computer they are troubleshooting has exposed distended capacitors. Which component has most likely failed?**
- A. Power supply
 - B. Motherboard
 - C. CPU
 - D. RAM
 - **Correct Answer:** B.
 - **Explanation:** Capacitors store energy and are located on the motherboard and inside the power supply. Since the capacitors are exposed, it likely means the technician is seeing the problem on the motherboard. CPUs and RAM do not have capacitors.
5. **You are using the best practice methodology to troubleshoot a video problem. During which step should you question the obvious?**
- A. Test the theory to determine cause.
 - B. Establish a theory of probable cause.
 - C. Identify the problem.
 - D. Establish a plan of action to resolve the problem.
 - **Correct Answer:** B.
 - **Explanation:** The second step in the best practice methodology is to establish a theory of probable cause (question the obvious). While it makes sense to question the obvious at all times during troubleshooting, it officially falls under this step in the best practice methodology.

6. **You are solving a problem with a desktop computer that was caused by human error. When is the appropriate time to implement preventive measures, according to the best practice methodology?**
- A. When documenting findings, actions, and outcomes
 - B. When testing the theory to determine cause
 - C. When verifying full system functionality
 - D. When questioning the user to identify user changes
 - **Correct Answer:** C.
 - **Explanation:** The fifth step in the best practice methodology is to verify full system functionality and, if applicable, implement preventive measures. This step occurs after a plan of action to resolve the problem has been established and before findings, actions, and outcomes have been documented.
7. **You are troubleshooting a Windows-based desktop computer that is experiencing unexpected shutdowns. Which of the following would be a good next step to resolve the issue? (Choose two.)**
- A. Reinstall Windows.
 - B. Replace the RAM.
 - C. Replace the motherboard, RAM, and CPU.
 - D. Replace the CPU.
 - **Correct Answer:** B, D.
 - **Explanation:** Intermittent shutdowns are hard to troubleshoot but are most likely hardware related. When troubleshooting, always make one change at a time to try to resolve the issue. Replacing the RAM or the CPU to see if it resolves the problem could be a good next step, but replacing three components at once is too many changes unless you have specific reason to believe it is all three. Reinstalling Windows is probably overkill as well. Narrow down the issue before implementing sweeping solutions such as that.
8. **You turn on a desktop computer. It beeps once, and you can hear the system fan running. Nothing appears on the screen. What is the most likely problem?**
- A. RAM has failed.
 - B. CPU has failed.
 - C. The monitor is disconnected.
 - D. The CPU or RAM has failed.
 - **Correct Answer:** C.
 - **Explanation:** When troubleshooting, always question the obvious. In this case, the system beeps once, which is usually a signal from the BIOS that POST completed successfully and air is coming from the system fan. All of that appears to be normal. Check to see that the monitor is connected properly to the desktop computer and that it's receiving power.
9. **You have implemented a solution that resolved an audio problem on a laptop computer. Following the best practice methodology, what is the next step to take?**
- A. Document findings, actions, and outcomes.
 - B. Verify full system functionality and, if applicable, implement preventive measures.

- C. Establish a plan of action to resolve the problem.
- D. Review system and application logs.
- **Correct Answer:** B.
- **Explanation:** The fourth step in the best practice methodology is to establish a plan of action to resolve the problem and implement the solution, which was done already. The next step is to verify full system functionality and, if applicable, implement preventive measures. The final step is to document findings, actions, and outcomes. Reviewing system and application logs is part of identifying the problem, which is the first step.

10. **You are training new technicians to install RAM and pointing out differences between packages. Which of the following are the numbers of pins that can be found on DIMM modules used in desktop motherboards? (Choose two.)**

- A. 180
- B. 184
- C. 200
- D. 204
- E. 232
- F. 240
- **Correct Answer:** B, F.
- **Explanation:** DIMMs used in desktop motherboard applications have one of four possible pin counts. SDR SDRAM is implemented on 168-pin modules. DDR SDRAM is implemented on 184-pin modules. DDR2 and DDR3 are implemented on 240-pin modules with different keying, and DDR4 and DDR5 DIMMs have 288 pins but different keying. Older dual-channel DIMM modules have 232 pins. Modules with 200 and 204 pins are used in the SODIMM line, and there are no modules with 180 pins.

11. **You are installing a new computer, and the user wants to use virtualization. Which hardware components need to support virtual technology for this to work properly? (Choose two.)**

- A. RAM
- B. Motherboard
- C. CPU
- D. BIOS
- **Correct Answer:** C, D.
- **Explanation:** For virtualization to work, both the CPU and BIOS need to support it. The operating system does as well. Virtualization support may need to be manually enabled in the BIOS. RAM does not need to support virtualization, and neither does the motherboard (except for the BIOS).

12. **You find out that a disgruntled ex-employee's computer has a boot password that must be entered before the operating system is ever loaded. There is also a password preventing your access to the BIOS utility. Which of the following motherboard components can most likely be used to return the computer to a state that will allow you to boot the system without knowing the password?**

- A. Cable header

- B. Power reset connector
- C. Toggle switch
- D. Jumper
- **Correct Answer: D.**
- **Explanation:** Most motherboards have a jumper or similar momentary closure mechanism that will allow you to clear the CMOS memory of any user settings and cause the BIOS to use factory defaults, including no user or supervisor passwords.

13. Your Core i5 fan has a 4-pin connector, but your motherboard only has a single 3-pin header with the CPU_FAN label. Which of the following will be the easiest solution to get the necessary cooling for your CPU?

- A. Plug the 4-pin connector into the 3-pin header.
- B. Buy a 4-pin to 3-pin adapter.
- C. Leave the plug disconnected and use only the heat sink.
- D. Add an extra chassis fan.
- **Correct Answer: A.**
- **Explanation:** The easiest solution that works to cool your CPU is to connect the 4-pin connector into the 3-pin header. The missing pin allows you to control the speed of the fan. Without it, the fan will run at top speed, which is fine, albeit a little noisier. There is no 4-pin to 3-pin power adapter. The heat sink alone should not be relied upon for proper cooling of modern CPUs, and an extra chassis fan isn't designed to specifically help cool the CPU.

14. You are installing a new video card into a PCIe slot. What is the combined total throughput of a PCIe 2.0 x16 slot?

- A. 500 MBps
- B. 1 GBps
- C. 16 GBps
- D. 32 GBps
- **Correct Answer: C.**
- **Explanation:** The PCIe 1.1 specification provided 250 Mbps of throughput per lane per direction. With the 2.x versions of PCIe, this rate was doubled to 500 Mbps. As a result, each v2.0 lane is capable of a combined 1 Gbps. An x16 slot consists of 16 lanes, for a total bidirectional throughput of 16 Gbps.

15. Which of the following allows you to perform the most complete restart of the computer without removing power?

- A. Start > Restart
- B. Start > Hibernate
- C. Reset button
- D. Power button
- **Correct Answer: C.**
- **Explanation:** The reset button causes the computer to return to nearly the same point it is in when you power it on, but without the need for power cycling. Using Restart in the Start menu does not reboot as deeply as the reset button. Hibernation is a power state that completely removes power after saving the

contents of RAM to the hard drive; pressing the power button is required to resume the session in the same manner as starting the computer after a complete shutdown. The power button cannot be used as a method of restarting the system.

16. You have just found out that a new UEFI upgrade exists for your computer, and you obtain a copy on a flash drive to install it. Which of the following is most helpful when flashing the UEFI on a desktop computer system?

- A. DVD-ROM
- B. Uninterruptable power supply
- C. Internet connection
- D. Windows administrator password
- **Correct Answer: B.**
- **Explanation:** None of the options are required, but a UPS (Uninterruptible Power Supply) is by far the most helpful among the answers in that loss of power during this procedure can range from annoying to devastating.

17. The 32 GB of DDR4 memory has failed in a client's desktop computer. The client requests that you upgrade the system for better performance when replacing the RAM. Which of the following is the best option?

- A. Install two new 32 GB DDR4 RAM modules.
- B. Install two new 128 GB DDR4 RAM modules.
- C. Install two new 32 GB DDR5 RAM modules.
- D. Install two new 128 GB DDR5 RAM modules.
- **Correct Answer: A.**
- **Explanation:** The only viable option listed is to install two new 32 GB DDR4 RAM modules. Check the motherboard documentation first to make sure the system will support that much memory, though. DDR4 does not come in modules larger than 64 GB. DDR5 is not compatible with DDR4 motherboards.

18. You are replacing an HP laptop's motherboard. Which type of motherboard should you use?

- A. ATX
- B. AT
- C. One for the specific model
- D. mini-ITX
- **Correct Answer: C.**
- **Explanation:** Laptop motherboards are usually custom-built for the specific case. A replacement board should be obtained that is the exact same size as the one that failed.

19. You need to install a new video card into a desktop computer. What type of expansion slot is preferred today for high-performance graphics adapters?

- A. AGP
- B. PCIe
- C. PCI
- D. SATA
- **Correct Answer: B.**

- **Explanation:** PCIe is the newest and fastest slot for video cards. AGP and PCI are legacy technologies. SATA is for hard drives.
- 20. **You are training new technicians to install RAM and pointing out differences between packages. Which of the following are the numbers of pins that can be found on DIMM modules used in desktop motherboards? (Choose two.)**
 - A. 180
 - B. 184
 - C. 200
 - D. 204
 - E. 232
 - F. 240
 - **Correct Answer:** B, F.
 - **Explanation:** DIMMs used in desktop motherboard applications have one of four possible pin counts. SDR SDRAM is implemented on 168-pin modules. DDR SDRAM is implemented on 184-pin modules. DDR2 and DDR3 are implemented on 240-pin modules with different keying, and DDR4 and DDR5 DIMMs have 288 pins but different keying. Older dual-channel DIMM modules have 232 pins. Modules with 200 and 204 pins are used in the SODIMM line, and there are no modules with 180 pins.

Chapter 12: Hardware and Network Troubleshooting

1. **If the video on your laptop is not working, what should you do to troubleshoot it? (Choose two.)**
 - A. Toggle the video function key.
 - B. Try using an external monitor.
 - C. Remove the display unit and reattach it.
 - D. Power the system off and back on.
 - **Correct Answer:** A, B.
 - **Explanation:** Two helpful troubleshooting steps for a non-working laptop video are toggling the video output function key (often Fn+F8) and plugging an external monitor into the laptop. Removing the display or powering the system off and on are not typically the first or most effective steps.
2. **A printer is printing unusually large margins on documents that are sent to it. You suspect that the paper size is set incorrectly. Where should you go to change this?**
 - A. Print spooler
 - B. Paper selection switch on the printer
 - C. Printing preferences
 - D. Print queue
 - **Correct Answer:** C.
 - **Explanation:** Printing preferences is where configuration options such as colour versus black and white, paper size, and page orientation are set. The print

spooler holds print jobs, and the print queue lists them. There is no paper selection switch on printers.

3. **A user tells you that his Android phone case is bulging, and the device has been hot to the touch lately. You suspect a swollen battery. Which of the following is a good next step?**
 - A. Replace the device.
 - B. Leave the device on to drain the battery, and then recharge the device.
 - C. Turn the device off, let it cool to room temperature, and then recharge the device.
 - D. Use the battery calibration utility.
 - **Correct Answer: A.**
 - **Explanation:** If a battery is swollen, the best solution is to replace the device. Attempting to charge a swollen battery or using a calibration utility is not recommended. Replacing the battery yourself may be possible if you are experienced, but caution is advised.
4. **You have implemented a solution that resolved an audio problem on a laptop computer. Following the best practice methodology, what is the next step to take?**
 - A. Document findings, actions, and outcomes.
 - B. Verify full system functionality and, if applicable, implement preventive measures.
 - C. Establish a plan of action to resolve the problem.
 - D. Review system and application logs.
 - **Correct Answer: B.**
 - **Explanation:** After implementing a solution, the next step in the best practice methodology is to verify full system functionality and, if applicable, implement preventive measures. Documentation is the final step, and establishing a plan or reviewing logs comes earlier in the process.
5. **While troubleshooting a client computer, you decide to obtain a new IP address from the DHCP server. After releasing the existing address, which command do you use to get new IP information from the DHCP server?**
 - A. `ipconfig /refresh`
 - B. `ipconfig /renew`
 - C. `ifconfig /release`
 - D. `ifconfig /start`
 - **Correct Answer: B.**
 - **Explanation:** The `ipconfig /renew` command sends a query to the DHCP server to resend and renew all DHCP information. `ifconfig` is used with Linux and macOS clients.
6. **Users are complaining that their print jobs are not printing. You open the print queue and see 50 jobs lined up. The printer is connected properly and online. What should you do?**
 - A. Open Printer Troubleshooting and have it diagnose the problem.
 - B. Stop and restart the print spooler.
 - C. Delete and reinstall the printer.

- D. Delete and reinstall Windows.
 - **Correct Answer:** B.
 - **Explanation:** If print jobs are stuck in the queue, you should stop and restart the print spooler service. Deleting and reinstalling the printer or Windows is unnecessary.
7. **The display on a laptop computer is continuously flickering. Which of the following are most likely to cause this problem? (Choose two.)**
- A. A failing display
 - B. Interference from a nearby fan
 - C. A failing backlight
 - D. A failing inverter
 - E. Incorrect video driver
 - **Correct Answer:** C, D.
 - **Explanation:** Perpetually dim or flickering screens are most likely caused by a failing backlight or inverter, which supplies power to the backlight. An incorrect video driver will not cause a flickering image, and LCD devices are not subject to interference from fans.
8. **You are having problems with the video card in one of your computers. Where could you check for troubleshooting information?**
- A. Another computer with the same video card
 - B. The video card manufacturer's website
 - C. The manual that came with the card
 - D. The server log
 - **Correct Answer:** B.
 - **Explanation:** The manufacturer's website is the primary source for troubleshooting information for your products. While older products might have come with paper manuals, PDFs are now typically downloaded from the website. Server logs show error codes but don't provide repair instructions.
9. **Your laser printer keeps printing vertical black lines on its output pages. What is the most likely cause of the problem?**
- A. There is a groove or scratch in the EP drum.
 - B. The EP drum-cleaning blade is broken.
 - C. The printer is low on toner.
 - D. The transfer corona wire is not working properly.
 - **Correct Answer:** A.
 - **Explanation:** Vertical black lines are most likely caused by a groove or scratch in the EP drum, which collects toner and deposits it onto the page. A broken cleaning blade would result in unreadable images (too much toner), low toner causes faded images, and a bad transfer corona wire causes blank images.
10. **The display on your laptop appears warped and fuzzy. You plug in an external monitor, and the image on it is fine. What is the most likely cause of the problem?**
- A. The video card
 - B. The LCD display
 - C. The motherboard

- D. The video driver
 - **Correct Answer:** B.
 - **Explanation:** If the external monitor's image is fine, the problem must be with the LCD display itself. If it were the video card or driver, the issue would persist on the external monitor as well.
11. **You have an inkjet printer. Recently, papers are being printed with excessive amounts of ink, and the ink is smearing. What is the most likely cause of the problem?**
- A. A faulty ink cartridge
 - B. A corrupted print driver
 - C. A faulty fuser
 - D. Too much humidity in the air
 - **Correct Answer:** A.
 - **Explanation:** A faulty ink cartridge with a hole can release excessive ink, leading to smearing. A corrupt print driver would cause garbage printing. Inkjet printers do not have a fuser. Excessive humidity might cause smearing but not excessive ink disbursement.
12. **You believe that a network card is beginning to fail. Which of the following tools should you use to see if the network card is capable of sending and receiving data from an RJ-45 port?**
- A. Toner probe
 - B. Loopback plug
 - C. Multimeter
 - D. Cable tester
 - **Correct Answer:** B.
 - **Explanation:** A loopback plug is used to test a network adapter's ability to send and receive data. It plugs into the NIC, and a loopback test is run via troubleshooting software.
13. **When you print documents on your laser printer, you see residue from previous images on the output. Which two things are the most likely causes of this problem? (Choose two.)**
- A. A faulty transfer corona wire
 - B. An overheating printer
 - C. A bad erasure lamp
 - D. A broken cleaning blade
 - **Correct Answer:** C, D.
 - **Explanation:** Seeing images from previous print jobs (ghosting) is most likely due to a bad erasure lamp or a broken cleaning blade. A faulty transfer corona wire would likely cause blank pages, and overheating doesn't necessarily leave residue.
14. **Troubleshooting a network connectivity issue takes you into the wiring closet, where you realize that none of the cables are properly labeled. Several are disconnected. Which tool should you use to determine where the cables run to?**
- A. Loopback plug

- B. Punch-down tool
- C. Cable tester
- D. Toner probe
- **Correct Answer: D.**
- **Explanation:** A toner probe is used to trace a cable from one location to another. A loopback plug tests network adapter functionality, punch-down tools connect wires to wiring racks, and cable testers verify cable functionality.

15. You turn on a laptop computer and the hard drive is not recognized. Where should you go to troubleshoot the issue?

- A. S.M.A.R.T. diagnostics
- B. BIOS/UEFI
- C. Windows Device Manager
- D. Boot sector manager
- **Correct Answer: B.**
- **Explanation:** If the hard drive is not recognized, the BIOS/UEFI is the place to check first. S.M.A.R.T. diagnostics are for working drives, and Device Manager is inaccessible if the drive isn't recognized at boot.

16. You turn a computer on and it doesn't boot up properly. You hear a rhythmic ticking sound coming from inside the case. What is most likely the problem?

- A. The motherboard
- B. The power supply fan
- C. The HDD
- D. The video card
- **Correct Answer: C.**
- **Explanation:** Only components with moving parts make ticking or clicking noises. A rhythmic ticking sound is most likely generated by a conventional hard disk drive (HDD).

17. You support an old impact printer at work. When the printer prints, there is always a blank horizontal line in the middle of each line of output. What is the most likely cause of the problem?

- A. The print ribbon is old and needs to be replaced.
- B. The print ribbon is not advancing properly.
- C. The print head needs to be replaced.
- D. The wrong print driver is installed.
- **Correct Answer: C.**
- **Explanation:** A consistent blank space indicates that a pin in the print head is not firing properly, meaning the print head needs to be replaced. Other options would result in faded printing, light and dark printing, or garbage output.

18. A network cable for a crucial server has failed. There are no premade Ethernet cables available, but there is bulk cable and connectors. Which tool do you need to use to make a new cable?

- A. Crimper
- B. Punch-down tool
- C. Cable tester

- D. Loopback plug
 - **Correct Answer:** A.
 - **Explanation:** A crimper is used to make network cables by attaching connectors to the ends of bulk cable. A punch-down tool is for wiring racks, a cable tester verifies cable function, and a loopback plug tests network adapters.
19. **A user brings in an iPhone and the touchscreen is not responding. What should you try first to get the device functioning again?**
- A. Hold the power button and the sleep/wake button for 10 seconds to reset the device.
 - B. Restore the device to factory settings.
 - C. Replace the battery in the device.
 - D. Hold the power button for 10 seconds to force the device to power off.
 - **Correct Answer:** D.
 - **Explanation:** The first step for a frozen smartphone is usually to force it to power off by holding the power button for about 10 seconds. If that doesn't work, then a reset (holding power and sleep/wake buttons) might be tried.
20. **You are troubleshooting a server and discover that one of the hard drives in the RAID 0 array has failed. Which statement is true?**
- A. You need to replace the failed drive, but the data is okay because the drive is configured as a mirror.
 - B. You need to replace the failed drive, but the data is okay because the drive is configured as a disk stripe with parity.
 - C. You need to replace the failed drive, and the data on the array is lost.
 - D. You do not need to replace the failed drive; the system will function normally.
 - **Correct Answer:** C.
 - **Explanation:** RAID 0 (disk striping) provides performance but no fault tolerance. If one drive in a RAID 0 array fails, the data on the entire array is lost, and you will need to replace the failed drive and restore data from a backup.

Chapter 13: Operating System Basics

1. **Which of the following can you type in the Start menu in Windows to open a command prompt? (Choose two.)**
- A. run
 - B. cmd
 - C. command
 - D. open
 - **Correct Answer:** B, C.
 - **Explanation:** You can open a command prompt by typing `cmd` or `command` in the Start menu. The command prompt utility will appear in the search results. "Run" is not a command; it is a dialog box. "Open" is not a command; it is an operating system action.

2. Which part of the operating system can be described as extremely specific software written for the purpose of instructing the OS on how to access a piece of hardware?
- A. Source code
 - B. Application
 - C. Kernel
 - D. Driver
 - **Correct Answer:** D.
 - **Explanation:** A driver is specifically written to instruct the operating system to communicate with a piece of hardware. Source code is the original code the software is written in. An application is a program written to perform a specific purpose to interact with the user. The kernel is the core of the operating system.
3. How do you increase the size of the taskbar?
- A. Right-click the mouse and drag the taskbar.
 - B. Left-click the mouse and double-click the taskbar.
 - C. Move the mouse pointer to the top of the taskbar, pausing until the pointer turns into a double-headed arrow, and then click and drag.
 - D. Highlight the taskbar and double-click in the center.
 - **Correct Answer:** C.
 - **Explanation:** You can increase the size of the taskbar by placing the cursor over the top of the taskbar and dragging it up. This assumes the taskbar is not locked.
4. Which of the following installation methods would you use if you wanted to install a program on a virtual machine? (Choose the best method.)
- A. ISO
 - B. USB
 - C. Optical disk
 - D. ZIP files
 - **Correct Answer:** A.
 - **Explanation:** If you want to install a program on a virtual machine, the preferred method would be to mount an ISO image of the application. USB and optical discs are not common installation methods for virtual machines. Although ZIP files could be used, a ZIP file is only a compression method and not a delivery method.
5. The Windows File Explorer program can be used to do which of the following? (Choose two.)
- A. Browse the Internet
 - B. Copy and move files
 - C. Change file attributes
 - D. Create backup jobs
 - **Correct Answer:** B, C.
 - **Explanation:** The Windows File Explorer program can be used to copy and move files. Windows File Explorer can also be used to change file attributes. Windows File Explorer cannot be used to browse the Internet or to create backup jobs.

6. **What is the maximum allowable length for the name of a file in Windows?**
- A. 8 characters
 - B. 32 characters
 - C. 64 characters
 - D. 255 characters
 - **Correct Answer:** D.
 - **Explanation:** The maximum allowable length for a filename is 255 characters.
7. **Which of the following is a program that runs on top of the OS and allows the user to issue commands through a set of menus or some other graphical interface?**
- A. Taskbar
 - B. Shell
 - C. Desktop
 - D. Source
 - **Correct Answer:** B.
 - **Explanation:** The shell is a program that runs on top of the OS and allows user interaction with the operating system. The taskbar is an element of the Desktop. The Desktop does not allow for commands to be executed. Source is not related to the graphical interface.
8. **If a program doesn't have a shortcut on the Desktop or in the All Apps submenu, you can start it by which of the following methods? (Choose the best answer.)**
- A. Using the shutdown command
 - B. Typing the program name in the Start box
 - C. Using the run command and typing in the name of the program
 - D. Typing cmd in the Start box followed by the program name
 - **Correct Answer:** B.
 - **Explanation:** Typing the program name in the Start box allows you to launch the program. The shutdown command will shut down the operating system. Run is not a command; it is a dialog box. The cmd command starts the command-prompt application.
9. **Which operating system feature offers the ability for a single application to have multiple requests into the processor at one time?**
- A. Multiuser mode
 - B. Dystopia
 - C. Preemption
 - D. Multithreading
 - **Correct Answer:** D.
 - **Explanation:** When a program is multithreaded, it is written to allow for multiple requests into the processor at one time. Multiuser mode, dystopia, and preemption are not correct answers.
10. **In Windows, a deleted file can be retrieved using which of the following?**
- A. My Computer icon
 - B. Recycle Bin
 - C. Control Panel
 - D. Settings app

- **Correct Answer:** B.
- **Explanation:** The Recycle Bin is a temporary spot that files are deleted to but from where they can be retrieved if deleted mistakenly. The My Computer icon is another, older way to start the File Explorer. Control Panel and the Settings app are used to customize the operating system.

11. **To turn off a Windows 10/11 operating system gracefully, you should do which of the following?**

- A. Run the turnoff command at a command prompt.
- B. Turn off the switch and unplug the machine.
- C. Press Ctrl+Alt+Del.
- D. Select Start, then the power icon, and then choose Shut Down.
- **Correct Answer:** D.
- **Explanation:** In Windows 10/11, when you click the Start button, a power icon is displayed on the lower left or lower right in Windows 11. From the power icon, you can sleep, reboot, or shut down the operating system. There is no command named turnoff. Turning the power switch off and unplugging the machine are not graceful ways to power off the operating system. Pressing Ctrl+Alt+Del alone will not power down the computer.

12. **What is the minimum amount of memory required for a 32-bit installation of Windows 10?**

- A. 128 MB
- B. 256 MB
- C. 512 MB
- D. 1 GB
- **Correct Answer:** D.
- **Explanation:** The minimum amount of memory required for the installation of the 32-bit Windows 10 operating system is 1 GB.

13. **What is the minimum amount of free hard drive space required for the installation of Windows 10 64-bit?**

- A. 1.5 GB
- B. 15 GB
- C. 32 GB
- D. 60 GB
- **Correct Answer:** C.
- **Explanation:** The minimum amount of free hard drive space required for Windows 10 64-bit is 32 GB.

14. **What is the minimum required memory for a 64-bit installation of Windows 10?**

- A. 512 MB
- B. 1 GB
- C. 2 GB
- D. 4 GB
- **Correct Answer:** C.
- **Explanation:** The minimum amount of memory required for the 64-bit installation of Windows 10 is 2 GB.

15. In Windows, a quick way to access Help is to press which keyboard key?

- A. F12
- B. The Windows key on the keyboard
- C. F1
- D. Alt
- **Correct Answer:** C.
- **Explanation:** A quick method of accessing Help is to press the F1 key. The Windows key on the keyboard launches the Start menu or Start screen. The F12 key and the Alt key perform various tasks, depending on the application.

16. Which of the following was a major change with the introduction of Windows 8?

- A. Start screen
- B. Gadgets
- C. Sidebar
- D. System tray
- **Correct Answer:** A.
- **Explanation:** The Start screen was introduced with Windows 8 and replaced the Start menu by providing a full-screen Start menu. Gadgets and the Sidebar were introduced in Windows Vista. The system tray is what the notification area is now called in the current operating system.

17. Which of the following is located on the rightmost portion of the taskbar?

- A. Start menu
- B. Quick Launch
- C. Notification area
- D. Shutdown options
- **Correct Answer:** C.
- **Explanation:** The notification area is the area on the rightmost portion of the taskbar. It is used to display the date and time and running background applications. The Quick Launch and Start menus are located on the leftmost portion of the taskbar. Shutdown options are found inside the Start menu in Windows 10.

18. In addition to right-clicking the Desktop, how else can you access the Display Properties settings?

- A. By clicking the Settings gear in the Start menu
- B. By clicking the System icon under Control Panel
- C. By pressing Ctrl+Alt+Esc
- D. By pressing Ctrl+Alt+Tab
- **Correct Answer:** A.
- **Explanation:** Clicking the Settings gear in the Start menu will open the Settings app. From there, the System category will allow you to change the Display Properties. Clicking the System icon under Control Panel allows you to change system settings. Pressing Ctrl+Alt+Esc launches the Task Manager. Pressing Ctrl+Alt+Tab launches the Task View in Windows 10/11.

19. Which of the following allows you to navigate file/folder structures in Windows?

- A. Start menu

- B. File Explorer
- C. KDE
- D. GNOME
- **Correct Answer: B.**
- **Explanation:** The File Explorer allows you to navigate the file/folder structure in Windows. The Start menu allows you to launch applications. KDE and GNOME are Linux desktop shells.

20. What is the minimum required processor speed for a 64-bit installation of Windows 10?

- A. 2.2 GHz
- B. 3.3 GHz
- C. 1.0 GHz
- D. 2.3 GHz
- **Correct Answer: C.**
- **Explanation:** The minimum processor speed required for the 64-bit installation of Windows 10 is 1 GHz.

Chapter 14: Windows Configuration

1. Which MMC snap-in allows you to start a program based on a condition?

- A. Programs and Features
- B. Task Scheduler
- C. Disk Management
- D. Group Policy Editor
- **Correct Answer: B.**
- **Explanation:** Task Scheduler will allow you to start a program based on a condition met, such as the computer starting up. The Programs and Features applet is not an MMC snap-in. The Disk Management MMC snap-in allows you to manage the disks attached to the computer. The Group Policy Editor lets you edit the local Group Policy.

2. In Windows, which of the following is the filesystem of choice for CD media?

- A. NTFS
- B. EFS
- C. FAT32
- D. CDFS
- **Correct Answer: D.**
- **Explanation:** The CDFS filesystem is used for CD media. NTFS is the native filesystem for Windows. FAT32 is a filesystem that was popular with Windows 9x operating systems and is also commonly used for USB flash drives for compatibility between platforms. EFS is a technology that encrypts files.

3. Which utility can be used to schedule a remote shutdown?

- A. taskmgr

- B. kill
 - C. shutdown
 - D. netstat
 - **Correct Answer: C.**
 - **Explanation:** The `shutdown` command can be used to restart or shut down a local or remote computer. The `taskmgr` command will launch Task Manager. The `kill` command is a Linux command that kills a process. The `netstat` command shows network statistics.
4. **Which event log should be checked if you suspect that the computer has rebooted unexpectedly?**
- A. Application
 - B. Boot
 - C. Security
 - D. System
 - **Correct Answer: D.**
 - **Explanation:** The System log contains information about operating system events, including unexpected reboots and hardware failures. The Application log contains information about application-specific events. The Security log contains information about security events, such as logon attempts. There is no Boot log.
5. **Which of the following filesystems is a proprietary filesystem created by Microsoft for use with large flash drives?**
- A. GPT
 - B. NFS
 - C. ext3
 - D. exFAT
 - **Correct Answer: D.**
 - **Explanation:** The exFAT filesystem is a Microsoft proprietary filesystem created for large flash drives. GPT is a partition table type, NFS is a network filesystem used with Linux/UNIX, and ext3 is a filesystem used with Linux.
6. **Which section in the Settings app lets you configure backups?**
- A. System
 - B. Devices
 - C. Apps
 - D. Update and Security
 - **Correct Answer: D.**
 - **Explanation:** The Update and Security section allows you to access the Backup screen, where you can configure backups for the operating system. The System section allows you to configure a multitude of options for Windows itself. The Devices section lets you configure devices, and the Apps section allows you to uninstall and configure applications.
7. **Which of the following filesystems is a proprietary filesystem created by Apple that offers SSD support?**
- A. HFS
 - B. ext4

- C. APFS
- D. exFAT
- **Correct Answer: C.**
- **Explanation:** The Apple File System (APFS) is a proprietary filesystem created for SSD support; it can be found on macOS Sierra 10.12.4, iOS 10.3, and tvOS 10.2 and later operating systems. Hierarchical File System (HFS) is a proprietary filesystem that was developed by Apple for the Mac OS back in 1985, ext4 (Fourth Extended File System) is used with Android and other Linux-based operating systems, and exFAT is a Microsoft proprietary filesystem created for large flash drives.

8. **Which Control Panel applet would you use to join the operating system to a domain?**

- A. System
- B. User Accounts
- C. Internet Options
- D. Programs and Features
- **Correct Answer: A.**
- **Explanation:** The System Control Panel applet is used to change the operating system computer name and change its membership from a workgroup to a domain, or domain to workgroup. The User Accounts applet is used to make changes to your user account or others on the operating system. The Internet Options applet is used to set options for Internet Explorer. The Programs and Features applet is used to uninstall and repair installed programs, as well as manage Windows features.

9. **What can you do if a program is not responding to any commands and appears to be locked up?**

- A. Open the System Control Panel applet and choose Performance to see what process is causing the problem.
- B. Add more memory.
- C. Press Ctrl+Alt+Delete to reboot the computer.
- D. Open Task Manager, select the appropriate task, and then click End Task.
- **Correct Answer: D.**
- **Explanation:** When a program is not responding to any commands, the process must be terminated via the Task Manager. You can end the process by opening the Task Manager, right-clicking the application, and selecting End Task. Viewing the performance will not make the process respond. Adding more memory is not possible without shutting down the computer. Pressing Ctrl+Alt+Delete without any further action will not reboot the computer.

10. **Which command will start the Event Viewer snap-in?**

- A. eventviewer.exe
- B. eventvwr.msc
- C. lusrmgr.msc
- D. devmgmt.msc
- **Correct Answer: B.**

- **Explanation:** The command `eventvwr.msc` will start the Event Viewer snap-in. The command `eventviewer.exe` is not a valid command. The command `lusrmgr.msc` will start the Local Users and Group snap-in. The command `devmgmt.msc` will start the Device Manager snap-in.

11. You need to configure an iSCSI connection; where will you find iSCSI settings?

- A. Storage Spaces applet
- B. Disk Management snap-in
- C. Administrative Tools
- D. Device Manager snap-in
- **Correct Answer: C.**
- **Explanation:** You will find iSCSI settings in Administrative Tools. The Storage Spaces applet is used to configure storage pools and virtual disks. The Disk Management snap-in is used to manage disks and partitions. The Device Manager snap-in is used to manage hardware devices.

12. Which type of resources do you configure in Device Manager?

- A. Hardware
- B. Files and folders
- C. Applications
- D. Memory
- **Correct Answer: A.**
- **Explanation:** Device Manager allows you to configure hardware resources. Files and folders are managed through File Explorer. Applications are managed through Programs and Features or the Settings app. Memory is managed by the operating system, although you can view memory usage in Task Manager.

13. What should be periodically done with mechanical hard drives to speed up performance when launching and saving files?

- A. Free up space
- B. Empty Recycle Bin
- C. Defragment
- D. Trim
- **Correct Answer: C.**
- **Explanation:** Defragmenting mechanical hard drives rearranges files to occupy contiguous chunks of space, which can speed up performance. Freeing up space and emptying the Recycle Bin can also improve performance by making more space available, but they don't rearrange files. Trim is a command used with SSDs to improve performance, not mechanical hard drives.

14. You have a number of files with a .des extension and you want to be able to search each file's metadata; which applet should this be configured in?

- A. Internet Options applet
- B. File Explorer Options applet
- C. Indexing Options applet
- D. Ease of Access Center applet
- **Correct Answer: C.**

- **Explanation:** The Indexing Options applet allows you to configure custom extensions so that metadata can be searched. The Internet Options applet is used to configure Internet Explorer. The File Explorer Options applet is used to view and configure the File Explorer. The Ease of Access Center applet is used to configure options related to user disabilities to make the operating system easier to use.

15. Which of the following partitions is specifically the partition from which the operating system boots?

- A. Primary partition
- B. Extended partition
- C. Dynamic partition
- D. Logical partition
- **Correct Answer:** A.
- **Explanation:** The operating system must boot from an active primary partition if MBR style partitioning is used. Extended partitions are used to contain logical partitions. There is no such thing as a dynamic partition.

16. Which of the following Registry hives contains information about the computer's hardware?

- A. HKEY_CURRENT_MACHINE
- B. HKEY_LOCAL_MACHINE
- C. HKEY_MACHINE
- D. HKEY_RESOURCES
- **Correct Answer:** B.
- **Explanation:** The HKEY_LOCAL_MACHINE Registry hive contains information about the computer's hardware. It is also known as HKLM. HKEY_CURRENT_MACHINE and HKEY_MACHINE are not valid Registry hives. HKEY_RESOURCES was used with Windows 9x operating systems but is no longer used.

17. Which of the following replaces the MBR in 64-bit versions of the Windows operating system?

- A. LILO
- B. NFS
- C. GPT
- D. GRUB
- **Correct Answer:** C.
- **Explanation:** GUID Partition Tables (GPT) allocates a 64-bit logical block addressing entry to partition tables to accommodate larger drives. GPT has rapidly replaced the MBR-style partition tables. LILO and GRUB are boot managers for Linux. NFS is a network filesystem used with Linux/UNIX operating systems.

18. Which of the following utilities will rearrange the files on your hard disk to occupy contiguous chunks of space?

- A. Disk Defragmenter
- B. Windows File Explorer

- C. Scandisk
- D. Windows Backup
- **Correct Answer:** A.
- **Explanation:** Disk Defragmenter will rearrange blocks of files on a hard drive to create contiguous files and space. Windows File Explorer is used to navigate the filesystem. Scandisk is not a command. Windows Backup allows for file backups.

19. Which power mode will write the contents of the RAM to the disk?

- A. Hibernate
- B. Standby
- C. Sleep
- D. Suspend
- **Correct Answer:** A.
- **Explanation:** The hibernate power mode will write the contents of the RAM to the disk so that the computer can enter a low power state. The standby power mode will turn off the monitor and lower power consumption by the computer. The sleep and suspend power mode will lower power consumption, but it will not write the contents of the RAM to the disk.

20. Which partition style allows up to 2,000 volumes to be partitioned on a physical disk?

- A. GPT
- B. MBR
- C. Dynamic Disk
- D. Basic Disk
- **Correct Answer:** C.
- **Explanation:** The Dynamic Disk partition style allows up to 2,000 volumes to be created on a physical disk. GUID Partition Tables (GPT) allow up to 128 volumes to be created on a physical disk. The Master Boot Record (MBR) and Basic Disk partitioning scheme are one and the same and allow up to 26 partitions to be created on a physical disk.