CompTIA 220-901 Syllabus Topics:

Topic	Details
Hardware 34%	

Given a scenario, configure settings and use BIOS/UEFI tools on a PC.	1. Firmware upgrades/flash BIOS
	2. BIOS component information
	
	  1. RAM
	  2. Hard drive
	  3. Optical drive
	  4. CPU
	
	3. BIOS configurations
	
	  1. Boot sequence
	  2. Enabling and disabling devices
	  3. Date/time
	  4. Clock speeds
	  5. Virtualization support
	  6. BIOS security (passwords, drive encryption: TPM, LoJack, secure boot)
	
	4. Built-in diagnostics
	5. Monitoring
	
	  1. Temperature monitoring
	  2. Fan speeds
	  3. Intrusion detection/notification
	  4. Voltage
	  5. Clock
	  6. Bus speed

Explain the importance of motherboard components, their purpose and properties.	1. Sizes
	
	  1. ATX
	  2. Micro-ATX
	  3. Mini-ITX
	  4. ITX
	
	2. Expansion slots
	
	  1. PCI
	  2. PCI-X
	  3. PCIe
	  4. miniPCI

Topic	Details

	3. RAM slots
	4. CPU sockets
	5. Chipsets
	
	    1. Northbridge
	    2. Southbridge
	
	6. CMOS battery
	7. Power connections and types
	8. Fan connectors
	9. Front/top panel connectors
	
	    1. USB
	    2. Audio
	    3. Power button
	    4. Power light
	    5. Drive activity lights
	
	10. Bus speeds
	11. Reset button

Compare and contrast various RAM types and their features.	1. Types
	
	    1. DDR
	    2. DDR2
	    3. DDR3
	    4. SODIMM
	    5. DIMM
	    6. Parity vs. non-parity
	    7. ECC vs. non-ECC
	    8. RAM configurations
	
	a) Single channel vs. dual channel vs. triple channel
	
	    1. Single sided vs. double sided
	    2. Buffered vs. unbuffered
	
	2. RAM compatibility

Install and configure PC expansion cards.	1. Sound cards 2. Video cards 3. Network cards 4. USB cards 5. Firewire cards 6. Thunderbolt cards 7. Storage cards 8. Modem cards 9. Wireless/cellular cards 10. TV tuner cards

Topic	Details
	11. Video capture cards 12. Riser cards

Install and configure storage devices and use appropriate media.	1. Optical drives
	
	    1. CD-ROM/CD-RW
	    2. DVD-ROM/DVD-RW/DVD-RW DL
	    3. Blu-ray
	    4. BD-R
	    5. BD-RE
	
	2. Magnetic hard disk drives
	
	    1. 5400 rpm
	    2. 7200 rpm
	    3. 10,000 rpm
	
	3. Hot swappable drives
	4. Solid state/flash drives
	
	    1. Compact flash
	    2. SD
	    3. MicroSD
	    4. MiniSD
	    5. xD
	    6. SSD
	    7. Hybrid
	    8. eMMC
	
	5. RAID types
	
	    1. 0
	    2. 1
	    3. 5
	    4. 10
	
	6. Tape drive
	7. Media capacity
	
	    1. CD
	    2. CD-RW
	    3. DVD-RW
	    4. DVD
	    5. Blu-ray
	    6. Tape
	    7. DVD DL

Topic	Details

Install various types of CPUs and apply the appropriate cooling methods.	1. Socket types
	
	  1. Intel: 775, 1155, 1156, 1366, 1150, 2011
	  2. AMD: AM3, AM3+, FM1, FM2, FM2+
	
	2. Characteristics
	
	  1. Speeds
	  2. Cores
	  3. Cache size/type
	  4. Hyperthreading
	  5. Virtualization support
	  6. Architecture (32-bit vs. 64-bit)
	  7. Integrated GPU
	  8. Disable execute bit
	
	3. Cooling
	
	  1. Heat sink
	  2. Fans
	  3. Thermal paste
	  4. Liquid-based
	  5. Fanless/passive

Compare and contrast various PC connection interfaces, their characteristics and purpose.	1. Physical connections
	
	  1. USB 1.1 vs. 2.0 vs. 3.0
	  2. Connector types: A, B, mini, micro
	  3. Firewire 400 vs. Firewire 800
	  4. SATA1 vs. SATA2 vs. SATA3, eSATA
	  5. Other connector types
	  6. VGA
	  7. HDMI
	  8. DVI
	  9. Audio
	  10. Analog
	  11. Digital (Optical connector)
	  12. RJ-45
	  13. RJ-11
	  14. Thunderbolt
	
	2. Wireless connections
	
	  1. Bluetooth
	  2. RF
	  3. IR
	  4. NFC

Topic	Details
	3. Characteristics 1. Analog 2. Digital 3. Distance limitations 4. Data transfer speeds 5. Quality 6. Frequencies
Install a power supply based on given specifications.	1. Connector types and their voltages 1. SATA 2. Molex 3. 4/8-pin 12v 4. PCIe 6/8-pin 5. 20-pin 6. 24-pin 2. Specifications 1. Wattage 2. Dual rail 3. Size 4. Number of connectors 5. ATX 6. MicroATX 7. Dual voltage options
Given a scenario, select the appropriate components for a custom PC configuration to meet customer specifications or needs.	1. Graphic/CAD/CAM design workstation 1. Multicore processor 2. High-end video 3. Maximum RAM 2. Audio/video editing workstation 1. Specialized audio and video card 2. Large fast hard drive 3. Dual monitors 3. Virtualization workstation 1. Maximum RAM and CPU cores 4. Gaming PC 1. Multicore processor 2. High-end video/specialized GPU

Global Skills Development Agency

Topic	Details

	3. High-definition sound card
	4. High-end cooling
	
	5. Home theater PC
	
	  1. Surround sound audio
	  2. HDMI output
	  3. HTPC compact form factor
	  4. TV tuner
	
	6. Standard thick client
	
	  1. Desktop applications
	  2. Meets recommended requirements for selected OS
	
	7. Thin client
	
	  1. Basic applications
	  2. Meets minimum requirements for selected OS
	  3. Network connectivity
	
	8. Home server PC
	
	  1. Media streaming
	  2. File sharing
	  3. Print sharing
	  4. Gigabit NIC
	  5. RAID array

Compare and contrast types of display devices and their features.	1. Types
	
	  1. LCD
	  2. TN vs. IPS
	  3. Fluorescent vs. LED backlighting
	  4. Plasma
	  5. Projector
	  6. OLED
	
	2. Refresh/frame rates
	3. Resolution
	4. Native resolution
	5. Brightness/lumens
	6. Analog vs. digital
	7. Privacy/antiglare filters
	8. Multiple displays
	9. Aspect ratios

Topic	Details
	1. 16:9 2. 16:10 3. 4:3

Identify common PC connector types and associated cables.	1. Display connector types
	
	  1. DVI-D
	  2. DVI-I
	  3. DVI-A
	  4. DisplayPort
	  5. RCA
	  6. HD15 (i.e., DE15 or DB15)
	  7. BNC
	  8. miniHDMI
	  9. miniDin-6
	
	2. Display cable types
	
	  1. HDMI
	  2. DVI
	  3. VGA
	  4. Component
	  5. Composite
	  6. Coaxial
	
	3. Device cables and connectors
	
	  1. SATA
	  2. eSATA
	  3. USB
	  4. Firewire (IEEE1394)
	  5. PS/2
	  6. Audio
	
	4. Adapters and convertors
	
	  1. DVI to HDMI
	  2. USB A to USB B
	  3. USB to Ethernet
	  4. DVI to VGA
	  5. Thunderbolt to DVI
	  6. PS/2 to USB
	  7. HDMI to VGA

Install and configure common peripheral devices.	1. Input devices
	
	  1. Mouse
	  2. Keyboard

Topic	Details

	3. Scanner
	4. Barcode reader
	5. Biometric devices
	6. Game pads
	7. Joysticks
	8. Digitizer
	9. Motion sensor
	10. Touch pads
	11. Smart card readers
	12. Digital cameras
	13. Microphone
	14. Webcam
	15. Camcorder
	
	2. Output devices
	
	  1. Printers
	  2. Speakers
	  3. Display devices
	
	3. Input & output devices
	
	  1. Touch screen
	  2. KVM
	  3. Smart TV
	  4. Set-top Box
	  5. MIDI-enabled devices

Install SOHO multifunction device/printers and configure appropriate settings.	1. Use appropriate drivers for a given operating system
	
	  1. Configuration settings
	  2. Duplex
	  3. Collate
	  4. Orientation
	  5. Quality
	
	2. Device sharing
	
	  1. Wired
	  2. USB
	  3. Serial
	  4. Ethernet
	  5. Wireless
	  6. Bluetooth
	  7. 802.11 (a/b/g/n/ac)
	  8. Infrastructure vs. ad hoc
	  9. Integrated print server (hardware)

Topic	Details

	10. Cloud printing/remote printing
	
	3. Public/shared devices
	
	   1. Sharing local/networked device via operating system settings
	   2. TCP/Bonjour/AirPrint
	   3. Data privacy
	   4. User authentication on the device
	   5. Hard drive caching

Compare and contrast differences between the various print technologies and the associated imaging process.	1. Laser
	
	   1. Imaging drum, fuser assembly, transfer belt, transfer roller, pickup rollers, separate pads, duplexing assembly
	   2. Imaging process: processing, charging, exposing, developing, transferring, fusing and cleaning
	
	2. Inkjet
	
	   1. Ink cartridge, print head, roller, feeder, duplexing assembly, carriage and belt
	   2. Calibration
	
	3. Thermal
	
	   1. Feed assembly, heating element
	   2. Special thermal paper
	
	4. Impact
	
	   1. Print head, ribbon, tractor feed
	   2. Impact paper
	
	5. Virtual
	
	   1. Print to file
	   2. Print to PDF
	   3. Print to XPS
	   4. Print to image

Given a scenario, perform appropriate printer maintenance.	1. Laser 1. Replacing toner, applying maintenance kit, calibration, cleaning 2. Therma

Topic	Details

	1. Replace paper, clean heating element, remove debris
	
	3. Impact
	
	  1. Replace ribbon, replace print head, replace paper
	
	4. Inkjet
	
	  1. Clean heads, replace cartridges, calibration, clear jams

Networking 21%	

Identify the various types of network cables and connectors.	1. Fiber
	
	  1. Connectors: SC, ST and LC
	
	2. Twisted Pair
	
	  1. Connectors: RJ-11, RJ-45
	  2. Wiring standards: T568A, T568B
	
	3. Coaxial
	
	  1. Connectors: BNC, F-connector

Compare and contrast the characteristics of connectors and cabling.	1. Fiber
	
	  1. Types (single-mode vs. multi-mode)
	  2. Speed and transmission limitations
	
	2. Twisted pair
	
	  1. Types: STP, UTP, CAT3, CAT5, CAT5e, CAT6, CAT6e, CAT7, plenum, PVC
	  2. Speed and transmission limitations
	  3. Splitters and effects on signal quality
	
	3. Coaxial
	
	  1. Types: RG-6, RG-59
	  2. Speed and transmission limitations
	  3. Splitters and effects on signal quality

Explain the properties and characteristics of TCP/IP.	1. IPv4 vs. IPv6 2. Public vs. private vs. APIPA/link local 3. Static vs. dynamic 4. Client-side DNS settings 5. Client-side DHCP

Topic	Details
	6. Subnet mask vs. CIDR 7. Gateway

Explain common TCP and UDP ports, protocols and their purpose.	1. Ports
	
	  1. 21 – FTP
	  2. 22 – SSH
	  3. 23 – TELNET
	  4. 25 – SMTP
	  5. 53 – DNS
	  6. 80 – HTTP
	  7. 110 – POP3
	  8. 143 – IMAP
	  9. 443 – HTTPS
	  10. 3389 – RDP
	  11. 137-139 – NetBIOS/NetBT
	  12. 445 – SMB/CIFS
	  13. 427 – SLP
	  14. 548 – AFP
	
	2. Protocols
	
	  1. DHCP
	  2. DNS
	  3. LDAP
	  4. SNMP
	  5. SMB
	  6. CIFS
	  7. SSH
	  8. AFP
	
	3. TCP vs. UDP

Compare and contrast various WiFi networking standards and encryption types.	1. Standards
	
	  1. 802.11 (a/b/g/n/ac)
	  2. Speeds, distances and frequencies
	
	2. Encryption types
	
	  1. WEP, WPA, WPA2, TKIP, AES

Given a scenario, install and configure SOHO wireless/ wired router and apply appropriate settings.	1. Channels 2. Port forwarding, port triggering 3. DHCP (on/off) 4. DMZ 5. NAT/DNAT 6. Basic QoS

Topic	Details
	7. Firmware 8. UPnP

Compare and contrast Internet connection types, network types and their features.	1. Internet connection types
	
	   1. Cable
	   2. DSL
	   3. Dial-up
	   4. Fiber
	   5. Satellite
	   6. ISDN
	   7. Cellular
	   8. Tethering
	   9. Mobile hotspot
	   10. Line-of-sight wireless Internet service
	
	2. Network Types
	
	   1. LAN
	   2. WAN
	   3. PAN
	   4. MAN

Compare and contrast network architecture devices, their functions and features.	1. Hub 2. Switch 3. Router 4. Access point 5. Bridge 6. Modem 7. Firewall 8. Patch panel 9. Repeaters/extenders 10. Ethernet over Power 11. Power over Ethernet injector
Given a scenario, use appropriate networking tools.	1. Crimper 2. Cable stripper 3. Multimeter 4. Tone generator and probe 5. Cable tester 6. Loopback plug 7. Punchdown tool 8. WiFi analyzer
Mobile Devices 17%	

Install and configure laptop hardware and components.	1. Expansion options
	
	   1. Expresscard /34
	   2. Expresscard /54
	   3. SODIMM
	   4. Flash

Topic	Details
	5. Ports/Adapters 6. Thunderbolt 7. DisplayPort 8. USB to RJ-45 dongle 9. USB to WiFi dongle 10. USB to Bluetooth 11. USB Optical Drive 2. Hardware/device replacement 1. Keyboard 2. Hard drive 3. SSD vs. hybrid vs. magnetic disk 4. 1.8in vs. 2.5in 5. Memory 6. Smart card reader 7. Optical drive 8. Wireless card 9. Mini-PCIe 10. Screen 11. DC jack 12. Battery 13. Touchpad 14. Plastics/frames 15. Speaker 16. System board 17. CPU
Explain the function of components within the display of a laptop.	1. Types 1. LCD 2. TN vs. IPS 3. Fluorescent vs. LED backlighting 4. OLED 2. WiFi antenna connector/placement 3. Webcam 4. Microphone 5. Inverter 6. Digitizer
Given a scenario, use appropriate laptop features.	1. Special function keys 1. Dual displays 2. Wireless (on/off) 3. Cellular (on/off) 4. Volume settings 5. Screen brightness 6. Bluetooth (on/off)

Topic	Details
	7. Keyboard backlight 8. Touch pad (on/off) 9. Screen orientation 10. Media options (fast forward/rewind) 11. GPS (on/off) Airplane mode 2. Docking station 3. Physical laptop lock and cable lock 4. Rotating/removable screens

Explain the characteristics of various types of other mobile devices.	1. Tablets
	2. Smartphones
	3. Wearable technology devices
	
	  1. Smart watches
	  2. Fitness monitors
	  3. Glasses and headsets
	
	4. Phablets
	5. e-Readers
	6. Smart camera
	7. GPS

Compare and contrast accessories and ports of other mobile devices.	1. Connection types
	
	  1. NFC
	  2. Proprietary vendor-specific ports (communication/power)
	  3. MicroUSB/miniUSB
	  4. Lightning
	  5. Bluetooth
	  6. IR
	  7. Hotspot/tethering
	
	2. Accessories
	
	  1. Headsets
	  2. Speakers
	  3. Game pads
	  4. Docking stations
	  5. Extra battery packs/battery chargers
	  6. Protective covers/water proofing
	  7. Credit card readers
	  8. Memory/MicroSD

Hardware and Network Troubleshooting 28%	
Given a scenario, troubleshoot common problems related to	1. Common symptoms

Topic	Details
motherboards, RAM, CPU and power with appropriate tools.	1. Unexpected shutdowns 2. System lockups 3. POST code beeps 4. Blank screen on bootup 5. BIOS time and settings resets 6. Attempts to boot to incorrect device 7. Continuous reboots 8. No power 9. Overheating 10. Loud noise 11. Intermittent device failure 12. Fans spin – no power to other devices 13. Indicator lights 14. Smoke 15. Burning smell 16. Proprietary crash screens (BSOD/pin wheel) Distended capacitors 2. Tools 1. Multimeter 2. Power supply tester 3. Loopback plugs 4. POST card/USB
Given a scenario, troubleshoot hard drives and RAID arrays with appropriate tools.	1. Common symptoms 1. Read/write failure 2. Slow performance 3. Loud clicking noise 4. Failure to boot 5. Drive not recognized 6. OS not found 7. RAID not found 8. RAID stops working 9. Proprietary crash screens (BSOD/pin wheel) 10. S.M.A.R.T. errors 2. Tools 1. Screwdriver 2. External enclosures 3. CHKDSK 4. FORMAT 5. File recovery software 6. Bootrec 7. Diskpart

Topic	Details
	8. Defragmentation tool
Given a scenario, troubleshoot common video, projector and display issues.	1. Common symptoms 1. VGA mode 2. No image on screen 3. Overheat shutdown 4. Dead pixels 5. Artifacts 6. Color patterns incorrect 7. Dim image 8. Flickering image 9. Distorted image 10. Distorted geometry 11. Burn-in 12. Oversized images and icons
Given a scenario, troubleshoot wired and wireless networks with appropriate tools.	1. Common symptoms 1. No connectivity 2. APIPA/link local address 3. Limited connectivity 4. Local connectivity 5. Intermittent connectivity 6. IP conflict 7. Slow transfer speeds 8. Low RF signal 9. SSID not found 2. Hardware tools 1. Cable tester 2. Loopback plug 3. Punchdown tools 4. Tone generator and probe 5. Wire strippers 6. Crimper 7. Wireless locator 3. Command line tools 1. PING 2. IPCONFIG/IFCONFIG 3. TRACERT 4. NETSTAT 5. NBTSTAT 6. NET 7. NETDOM

Topic	Details
	8. NSLOOKUP
Given a scenario, troubleshoot and repair common mobile device issues while adhering to the appropriate procedures.	1. Common symptoms 1. No display 2. Dim display 3. Flickering display 4. Sticking keys 5. Intermittent wireless 6. Battery not charging 7. Ghost cursor/pointer drift 8. No power 9. Num lock indicator lights 10. No wireless connectivity 11. No Bluetooth connectivity 12. Cannot display to external monitor 13. Touchscreen non-responsive 14. Apps not loading 15. Slow performance 16. Unable to decrypt email 17. Extremely short battery life 18. Overheating 19. Frozen system 20. No sound from speakers 21. GPS not functioning 22. Swollen battery 2. Disassembling processes for proper re-assembly 1. Document and label cable and screw locations 2. Organize parts 3. Refer to manufacturer resources 4. Use appropriate hand tools
Given a scenario, troubleshoot printers with appropriate tools.	1. Common symptoms 1. Streaks 2. Faded prints 3. Ghost images 4. Toner not fused to the paper 5. Creased paper 6. Paper not feeding 7. Paper jam 8. No connectivity 9. Garbled characters on paper 10. Vertical lines on page 11. Backed up print queue 12. Low memory errors

Topic	Details

	13. Access denied
	14. Printer will not print
	15. Color prints in wrong print color
	16. Unable to install printer
	17. Error codes
	18. Printing blank pages
	19. No image on printer display
	
	2. Tools
	
	   1. Maintenance kit
	   2. Toner vacuum
	   3. Compressed air
	   4. Printer spooler

Laptop Troubleshoot	Laptop troubleshooting and maintenance