CompTIA A+

220-1201 Core 1 — Cheat Sheet Study Guide

Mobile Devices · Networking · Hardware · Cloud/Virtualization · Troubleshooting

Domain 1: Mobile Devices — 15% of exam

Connection Types	
USB-C / Lightning	Data, charging, video; USB-C reversible, Lightning Apple-only
Bluetooth	Short-range wireless (≈30 ft); pairing required
Wi-Fi (802.11)	a/b/g/n/ac(Wi-Fi 5)/ax(Wi-Fi 6)
NFC	Near Field Comm. ≤4 cm; tap-to-pay
Hotspot/Tethering	Share cellular data via Wi-Fi, USB, BT
IR Blaster	Line-of-sight remote control
GPS	Location via satellite; uses A-GPS for speed

Mobile Hardware	
LCD	CCFL/LED backlit; IPS (wide angles), TN (fast), VA
OLED/AMOLED	Self-emitting pixels; true black, flexible
Digitizer	Touch layer; glass or plastic overlay
Battery	Li-Ion or Li-Poly; calibrate by full discharge/charge
Camera	Front (selfie) + rear; OIS = optical image stabilization
MicroSD	Expandable storage; up to 1 TB

Mobile OS Features	
Android	Open-source; sideloading allowed; Google Play
iOS	Closed ecosystem; App Store only; no sideload (stock)
MDM	Mobile Device Mgmt — enforce policy, remote wipe
BYOD	Employee-owned device on corp network; MDM required
VPN on Mobile	Encrypts traffic; required for corp access

Troubleshooting Mobile	
No power	Check charge port, cable, battery, hard reset
Touchscreen unresponsive	Clean screen, remove case, soft reset
Overheating	Remove case, close apps, avoid direct sun
Dim display	Adjust brightness; check auto-brightness setting
Poor signal	Toggle airplane mode; check carrier/SIM
App crashing	Clear cache, reinstall, check storage space

Domain 2: Networking — 20% of exam

Key Ports & Protocols	
20/21 — FTP	File Transfer Protocol; 21 control, 20 data
22 — SSH	Secure Shell; encrypted remote access
23 — Telnet	Unencrypted remote; avoid in production
25 — SMTP	Send email; also 465/587 (TLS)

53 — DNS	Domain Name System; UDP (queries) / TCP (zone xfer)
67/68 — DHCP	Dynamic IP assignment; Discover-Offer-Request-Ack
80 — HTTP	Web traffic unencrypted
110 — POP3	Retrieve email; downloads and deletes from server
143 — IMAP	Retrieve email; leaves on server; sync
443 — HTTPS	HTTP over TLS/SSL
445 — SMB	Windows file sharing; Active Directory
3389 — RDP	Remote Desktop Protocol; Windows screen share

Network Hardware	
Hub	Layer 1; broadcasts all ports; obsolete
Switch	Layer 2; forwards by MAC; creates collision domains
Router	Layer 3; routes by IP between networks
AP	Wireless access point; bridges wired↔wireless
Firewall	Filters traffic by rules (port/IP/protocol)
Modem	Converts digital↔analog; DSL/cable
PoE Switch	Power over Ethernet (802.3af/at) to devices
Patch Panel	Terminates horizontal cabling; organized
IDS/IPS	Intrusion Detection/Prevention system

Wireless Standards (802.11)	
802.11a	5 GHz; 54 Mbps; short range
802.11b	2.4 GHz; 11 Mbps; legacy
802.11g	2.4 GHz; 54 Mbps; backward compat
802.11n (Wi-Fi 4)	2.4/5 GHz; 600 Mbps; MIMO
802.11ac (Wi-Fi 5)	5 GHz; 3.5 Gbps; MU-MIMO
802.11ax (Wi-Fi 6)	2.4/5/6 GHz; 9.6 Gbps; OFDMA
Channels 2.4 GHz	Non-overlapping: 1, 6, 11
WPA2	AES/CCMP encryption; current standard
WPA3	SAE handshake; stronger than WPA2

TCP/IP & OSI Quick Ref	
Layer 7 — Application	HTTP, FTP, DNS, SMTP
Layer 6 — Presentation	Encryption, compression, format
Layer 5 — Session	NetBIOS, RPC — connection mgmt
Layer 4 — Transport	TCP (reliable) / UDP (fast); port #s
Layer 3 — Network	IP, ICMP, routing
Layer 2 — Data Link	MAC, Ethernet, switches
Layer 1 — Physical	Cables, hubs, bits on wire

IP Addressing	
Class A	1–126.x.x.x /8 — large networks
Class B	128–191.x.x.x /16 — medium
Class C	192–223.x.x.x /24 — small (≤254 hosts)
Private (RFC1918)	10.x, 172.16-31.x, 192.168.x
APIPA	169.254.x.x — DHCP failure fallback
IPv6 loopback	::1 (IPv4 = 127.0.0.1)
Subnet /24	255.255.255.0 — 254 usable hosts
Subnet /25	255.255.255.128 — 126 hosts, 2 subnets

Cable Types	
Cat 5	100 Mbps; 100m; 100BASE-TX
Cat 5e	1 Gbps; 100m; reduced crosstalk

Cat 6	1 Gbps (100m) / 10 Gbps (55m)
Cat 6a	10 Gbps; 100m; shielded (STP)
Coax RG-6	Cable TV/internet; F-type connector
Fiber — MMF	Multi-mode; short dist; orange/aqua; LED
Fiber — SMF	Single-mode; long dist; yellow; laser
Plenum	Fire-rated jacket for air ducts (not PVC)
T568A/B	Wiring standards; B most common in US
Straight-through	PC↔switch; same standard both ends
Crossover	PC↔PC or switch↔switch (old; auto-MDI now)

Domain 3: Hardware — 25% of exam

Storage Technologies	
HDD	Magnetic platters; 5400/7200 RPM; SATA
SSD — SATA	No moving parts; 500 MB/s; 2.5" or mSATA
SSD — NVMe/M.2	PCIe x4; 3500+ MB/s; M.2 slot (2280 common)
RAID 0	Striping; speed, NO redundancy; min 2 drives
RAID 1	Mirroring; redundancy; min 2 drives
RAID 5	Striping + parity; min 3 drives; 1 drive can fail
RAID 10	Mirror + stripe; min 4 drives; best performance+safety
SAS	Serial Attached SCSI; enterprise; 12+ Gbps

RAM Types & Specs	
DDR4	2133–3200 MHz; 288-pin DIMM; 1.2V
DDR5	4800+ MHz; 288-pin; 1.1V; on-die ECC
SO-DIMM	Laptop RAM; 260-pin (DDR4/5)
ECC RAM	Error-correcting; servers/workstations
Dual Channel	2 sticks same spec in matched slots
XMP/EXPO	OC profiles; Intel XMP / AMD EXPO
Virtual RAM	Pagefile on disk; much slower than DRAM

CPU & Motherboard	
Socket — Intel	LGA (pins on board): LGA1700 (12th-14th gen)
Socket — AMD	AM5 (Ryzen 7000+); AM4 (Ryzen 3000-5000)
Cores/Threads	Cores = physical; Threads = logical (HT/SMT)
Cache L1/L2/L3	L1 fastest/smallest → L3 slower/largest
Chipset	Northbridge/Southbridge (legacy) or single PCH
BIOS/UEFI	UEFI modern; secure boot; GPT support
PCIe slots	x1 (audio/NICs), x4 (NVMe), x16 (GPU)
Form Factors	ATX > mATX > Mini-ITX; screws same spacing

Power Supply	
ATX 24-pin	Main motherboard connector
EPS 8-pin	CPU/processor power
PCIe 6/8-pin	GPU power
SATA Power	L-shaped 15-pin; storage devices
Molex 4-pin	Legacy fans, older drives
80 Plus rating	Bronze/Silver/Gold/Platinum/Titanium efficiency
Wattage	Add all component TDPs + 20% headroom
Rails	+3.3V, +5V, +12V, -12V, +5VSB

Printer Types	
Laser	Toner + drum; HVAC photosensitive drum; fastest
Inkjet	Liquid ink; high quality photos; expensive per page
Thermal	Receipt printers; heat-sensitive paper; no ink
Impact/Dot Matrix	Ribbon; multipart forms; loud
3D Printer	FDM (filament) or resin; layer-by-layer

Laser Print Process (In Order)	
1. Processing	RIP converts data to bitmap
2. Charging	Primary corona charges drum negative (-600V)
3. Exposing	Laser neutralizes areas to print
4. Developing	Toner clings to exposed (less negative) areas
5. Transferring	Transfer belt/corona moves toner to paper
6. Fusing	Heat + pressure fuses toner to paper
7. Cleaning	Scraper cleans residual toner from drum

Domain 4: Virtualization & Cloud Computing — 11% of exam

Virtualization Concepts		Cloud Service Models	
Hypervisor Type 1	Bare-metal; runs directly on hardware (ESXi, Hyper-V, KVM)	**IaaS**	Infrastructure as a Service — VMs, networking (AWS EC2, Azure VMs)
Hypervisor Type 2	Runs inside host OS (VMware Workstation, VirtualBox)	**PaaS**	Platform as a Service — app dev platform (Azure App Service, Heroku)
VM	Virtual Machine; isolated OS instance with virtual hardware	**SaaS**	Software as a Service — end-user apps (Office 365, Salesforce)
Container	Shares host OS kernel; lighter than VM (Docker)	**Public Cloud**	Resources owned/managed by provider; shared infrastructure
Snapshot	Point-in-time VM state capture; easy rollback	**Private Cloud**	Dedicated infrastructure; on-prem or hosted; single org
vCPU / vRAM	Virtual CPU and RAM allocated to VM	**Hybrid Cloud**	Mix of public + private; workloads move between them
Resource Pooling	Multiple VMs share physical host resources	**Community Cloud**	Shared by orgs with common concerns (gov, healthcare)
Live Migration	Move running VM between hosts (vMotion)	**Cloud Storage**	OneDrive, Google Drive, iCloud, S3 — offsite backup/sync

Domain 5: Hardware & Network Troubleshooting — 29% of exam

CompTIA Troubleshooting Methodology (6 Steps)	
1. Identify the problem	Gather info, question user, identify symptoms, back up data
2. Establish theory	Question the obvious; consider multiple approaches
3. Test the theory	Confirm or disprove; if not confirmed, re-establish new theory
4. Establish action plan	Plan steps to resolve; consider impact/side effects
5. Implement / verify	Implement solution; verify full system functionality
6. Document	Record findings, actions taken, and outcome

RAM/CPU Symptoms	
BSOD / Stop Error	Often RAM, driver, or hardware fault
Random restarts	Overheating, PSU, or unstable RAM
POST beep codes	Vary by BIOS vendor; RAM/GPU common
Slow performance	Insufficient RAM, high CPU usage, malware
Overheating CPU	Check thermal paste, clean heatsink/fan
No POST	Reseat RAM, GPU; check CPU power connector

Storage Symptoms	
Click of death	HDD head crash — replace ASAP, back up now
SMART errors	Drive predicting failure; replace proactively
Read/write errors	Bad sectors; run chkdsk or fsck
Missing drive in BIOS	Check SATA cable, power, BIOS SATA mode
Slow transfer speeds	SATA vs NVMe mismatch; fragmentation (HDD)
OS not found	Check boot order, partition, MBR/GPT

Display Troubleshooting	
No image	Check cable, power, input source, GPU seated
Dim display	Backlight failure; check brightness, inverter
Dead pixels	Permanently off — manufacturer defect
Stuck pixels	Fixed color — software pixel-fix tools
Burn-in	Ghost image on OLED; reduce static content
Flickering	Loose cable, refresh rate, driver issue
Overscan	Image cut off; adjust display settings/scaling

Network Troubleshooting	
ping	Test connectivity; ping 127.0.0.1 = loopback
ipconfig /all	View IP, subnet, gateway, DNS, MAC
ipconfig /release+renew	Release and request new DHCP lease
nslookup	DNS query tool; test name resolution
tracert / traceroute	Hop-by-hop path; find where traffic fails
netstat	Active connections, listening ports
pathping	Combines ping + tracert; packet loss per hop
No internet (has IP)	Check gateway, DNS; ping 8.8.8.8
APIPA address	169.254.x.x = DHCP server unreachable

Printer Troubleshooting	
No print / jobs queued	Clear print queue; restart spooler service
Faded prints (laser)	Low toner; shake cartridge; replace
Streaks/lines	Dirty drum or corona wire; replace drum
Paper jams	Remove all pieces; check rollers/fuser
Ghost image	Drum not cleaning; replace drum unit
Smearing (laser)	Fuser failure; replace fuser assembly
Offset color (inkjet)	Misaligned heads; run alignment utility

Power & Safety	
ESD	Electrostatic discharge; use wrist strap, mat
No power	Check wall, breaker, PSU switch, cable
PSU fan not spinning	PSU failed or no load; test with multimeter
Burning smell	Shut down immediately; PSU or component failure
UPS	Uninterruptible power supply; battery backup + surge
Surge protector	Protects against spikes; not same as UPS
MSA	Material Safety Data Sheet for toner/chemicals