

CompTIA A+ Core 1 (220-1101) — Master Cheat Sheet

Passing score: 675 / 900 | 90 questions | 90 minutes | 5 domains

DOMAIN WEIGHTS

Domain	Weight & Focus
Mobile Devices	27% — largest domain, focus on connectors, displays, apps
Networking	20% — OSI model, protocols, ports, cables, wireless
Hardware	25% — CPUs, RAM, storage, motherboards, power
Virtualization & Cloud	15% — hypervisors, cloud types, deployment models
Hardware Troubleshooting	13% — POST, BIOS, storage failures, peripherals

NETWORKING — OSI MODEL (memorize this!)

Mnemonic: Please Do Not Throw Sausage Pizza Away (Physical → Application)

Layer	What it does
7 — Application	HTTP, FTP, DNS, SMTP, DHCP — what the user sees
6 — Presentation	Encryption, compression, formatting (SSL/TLS)
5 — Session	Manages sessions between apps (NetBIOS, RPC)
4 — Transport	TCP (reliable) vs UDP (fast, no guarantee) — ports live here
3 — Network	IP addressing, routing — routers operate here
2 — Data Link	MAC addresses, switches, frames — Ethernet
1 — Physical	Cables, hubs, bits — actual electrical signals

COMMON PORTS — Know These Cold

Port	Protocol & Purpose
20/21	FTP — File Transfer Protocol (20=data, 21=control)
22	SSH — Secure Shell (encrypted remote access)
23	Telnet — unencrypted remote access (insecure, avoid)
25	SMTP — sending email
53	DNS — Domain Name System (TCP + UDP)
67/68	DHCP — 67=server, 68=client
80	HTTP — unencrypted web
110	POP3 — retrieve email (downloads and deletes from server)
143	IMAP — retrieve email (leaves copy on server)
389	LDAP — directory services
443	HTTPS — encrypted web (TLS)
445	SMB — Windows file sharing
3389	RDP — Remote Desktop Protocol (Windows remote access)

TCP vs UDP

TCP	Connection-oriented, 3-way handshake (SYN→SYN-ACK→ACK), reliable, ordered. Used for: HTTP, FTP, SMTP, SSH
UDP	Connectionless, no handshake, fast, no guaranteed delivery. Used for: DNS, DHCP, video streaming, VoIP

WIRELESS STANDARDS (802.11)

Standard	Band / Speed / Notes
802.11a	5 GHz — 54 Mbps — older, short range
802.11b	2.4 GHz — 11 Mbps — oldest common standard
802.11g	2.4 GHz — 54 Mbps — backward compatible with b
802.11n	2.4/5 GHz — 600 Mbps — MIMO antennas, 'WiFi 4'
802.11ac	5 GHz — up to 3.5 Gbps — MU-MIMO, 'WiFi 5'
802.11ax	2.4/5/6 GHz — up to 9.6 Gbps — OFDMA, 'WiFi 6/6E'
Tip: 2.4 GHz = longer range, more interference. 5/6 GHz = faster, shorter range. Exam often asks about channels and interference.	

NETWORK CABLES

Cable Type	Speed / Distance / Notes
Cat 5	100 Mbps — 100m max — obsolete
Cat 5e	1 Gbps — 100m max — reduced crosstalk — most common
Cat 6	1 Gbps (up to 10 Gbps at 55m) — stricter specs
Cat 6a	10 Gbps — 100m max — augmented Cat 6
Cat 7	10 Gbps — 100m — shielded (STP), not TIA-recognized
Cat 8	25/40 Gbps — 30m — data centers
Fiber SMF	Single-mode — long distances — laser light — yellow jacket
Fiber MMF	Multi-mode — shorter distances — LED light — orange/aqua jacket
Coaxial	Cable TV, older networks — RG-6 (cable TV), RG-59 (CCTV)

HARDWARE — CPUs & RAM

CPU Socket Types

Intel LGA	Land Grid Array — pins on motherboard, flat pads on CPU
AMD AM4/AM5	Zero Insertion Force — pins on CPU, holes on motherboard
Intel BGA	Ball Grid Array — soldered, common in laptops — not upgradeable

RAM Types

Type	Key Details
DDR4	Typical for desktops/laptops 2015–2022 — 288-pin DIMM, 200-pin SO-DIMM
DDR5	Newer standard — faster speeds, higher capacity per stick
ECC	Error Correcting Code — server RAM — detects/corrects single-bit errors
SO-DIMM	Small Outline — used in laptops and small form factor PCs

Channels	Dual-channel = 2 sticks for 2× bandwidth. Match sticks for best performance
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STORAGE INTERFACES & TYPES

Type	Speed / Notes
SATA III	6 Gbps — connects HDDs, SSDs, optical — most common interface
M.2 SATA	SATA speeds via M.2 slot — cheaper, slower M.2
M.2 NVMe	PCIe-based — up to 7 GB/s (Gen 4) — fastest consumer storage
PCIe NVMe	Add-in card — enterprise use — fastest option
HDD	Spinning disk — 5400/7200 RPM — high capacity, slow, fragile
SSD (SATA)	NAND flash, SATA interface — ~500 MB/s — big speed jump from HDD
SSD (NVMe)	NAND flash, PCIe — 3–7 GB/s — best for OS and applications
Optical (ODD)	CD/DVD/Blu-ray — SATA interface — increasingly rare

MOTHERBOARD FORM FACTORS

Form Factor	Size / Use Case
ATX	12×9.6 in — standard desktop — most expansion slots
Micro-ATX	9.6×9.6 in — fewer slots — budget/mid-range builds
Mini-ITX	6.7×6.7 in — small form factor — 1 PCIe slot
E-ATX	12×13 in — workstation/server — extra slots

DISPLAY CONNECTORS

Connector	Key Details
VGA	Analog — 15-pin D-sub — older monitors — blue connector
DVI	Digital/analog hybrid — white connector — older monitors
HDMI	Digital audio + video — most common — consumer electronics
DisplayPort	Digital A/V — locking connector — high refresh rate monitors
Thunderbolt	Intel — up to 40 Gbps — also carries power + data + display
USB-C DP	DisplayPort over USB-C — common on modern laptops

MOBILE DEVICES

Connector Types

USB-C	Reversible — USB 3.1/3.2/4, Thunderbolt 3/4 — universal standard
Lightning	Apple proprietary — older iPhones/iPads — being phased out
Micro-USB	Older Android devices — directional, fragile
Mini-USB	Older cameras/GPS units — rare now

Display Technologies

LCD (IPS)	In-Plane Switching — wide viewing angles, accurate color
LCD (TN)	Twisted Nematic — fast response, poor viewing angles

OLED	Organic LED — true blacks, vibrant color, power efficient
AMOLED	Samsung's OLED variant — used in high-end phones
Retina	Apple marketing term for high-DPI displays

Cellular Standards

3G	HSPA+ — older — 7–42 Mbps
4G LTE	Long-Term Evolution — 100 Mbps typical
5G	Sub-6 GHz (wide coverage) and mmWave (ultra fast, short range)

VIRTUALIZATION & CLOUD

Hypervisors

Type 1 (bare-metal)	Runs directly on hardware — VMware ESXi, Hyper-V, Xen — used in servers
Type 2 (hosted)	Runs on top of OS — VMware Workstation, VirtualBox — used on desktops

Cloud Service Models

IaaS	Infrastructure as a Service — rent VMs, storage, networking (AWS EC2, Azure VM)
PaaS	Platform as a Service — dev environment without managing OS (Heroku, Azure App Service)
SaaS	Software as a Service — full app in browser (Gmail, Office 365, Salesforce)

Cloud Deployment Models

Public	Shared infrastructure owned by provider (AWS, Azure, GCP)
Private	Dedicated infrastructure — on-premises or hosted — more control
Hybrid	Mix of public and private — common for compliance or burst workloads
Community	Shared by orgs with similar requirements (government, healthcare)

HARDWARE TROUBLESHOOTING

POST Beep Codes (AMI BIOS common)

Beep Code	Meaning
1 beep	POST success — normal
2 beeps	RAM error
3 beeps	Memory error (base 64K)
5 beeps	CPU error
6 beeps	Keyboard controller error
8 beeps	Video card / display memory error
Continuous	Power issue — check PSU and RAM seating

Common Failure Symptoms

Symptom	Likely Cause & Fix
No POST	Check power, RAM seating, GPU — try minimal config (1 stick RAM, no GPU)
Overheating	Clean fans/vents, replace thermal paste, check airflow

Blue Screen (BSOD)	Driver issue, bad RAM (run MemTest86), failing HDD, overheating
Random shutdowns	Overheating or PSU failing — check temps first
No display	Check cable, try different port/cable, reseal GPU
HDD clicking	Imminent failure — back up immediately
Slow boot	Fragmented HDD, full storage, too many startup programs, failing drive
Printer streaks	Low toner / ink, dirty drum (laser), clogged nozzles (inkjet)

PRINTER TYPES

Type	How it works / Best for
Laser	Uses toner (powder) + heat/pressure — fast, cheap per page, great for text
Inkjet	Liquid ink — good for photos — slow, expensive per page, nozzles clog
Thermal	Heat-sensitive paper — no ink — receipt printers, label printers
Impact/Dot-matrix	Pins strike ribbon — noisy but works in triplicate forms — industrial use

EXAM-DAY STRATEGY

Passing score: 675 out of 900 (~75%). Don't need perfection — aim for 80%+ in practice tests.

PBQs (Performance-Based Questions): Drag-and-drop, simulations. Flag them and come back — they take time. Always attempt: partial credit counts.

Question type	Strategy
'Best answer'	Two answers may be right — pick the MOST correct one for the scenario
'Most likely'	Choose common real-world cause, not edge cases
'First step'	Safety first, then check the obvious/simple things before replacing hardware
Eliminate 2 first	Narrow to 2 options, then decide — don't second-guess too much
Flag & move	Don't burn 5 minutes on one question — flag and return

Best free resources: Professor Messer (professormesser.com) — free video series. ExamCompass.com — free practice tests. Anki/Quizlet — search 'CompTIA A+ Core 1 220-1101'.