

# Certified Quantum Systems Professional (CQSP)

## Exam Objectives

### About the exam

**Level:** Intermediate

**Number of items:** 80 (single-answer and multiple-response scenario questions, including circuit tracing and numeric reasoning)

**Time limit:** 120 minutes

**Scoring:** Scaled 100 to 900. Cut score 700. Multiple-response items are scored all or nothing.

**Delivery:** Online, proctored (webcam, microphone and screen). Flagged attempts are reviewed by a person.

**Prerequisites:** No formal prerequisite. Candidates do best with linear algebra at first-year level, comfort reading code in any language, and 60 to 90 hours of study.

**Validity:** 3 years. Renew with 45 CEUs per cycle and the \$35 annual continuing-education fee, or by passing the current exam.

**Language:** English

**Exam voucher:** \$199. Bundles with a retake and the study guide ebook are available.

### Domain weights

| Domain                                          | Weight      |
|-------------------------------------------------|-------------|
| D1 Quantum Information Foundations              | 20%         |
| D2 Gates, Circuits and Measurement              | 22%         |
| D3 Algorithms and Complexity                    | 20%         |
| D4 Hardware, Noise and Error Correction         | 15%         |
| D5 Programming, Simulation and Hybrid Workflows | 10%         |
| D6 Post-Quantum Security and Business Adoption  | 13%         |
| <b>Total</b>                                    | <b>100%</b> |

## Objectives by domain

Each objective may appear as knowledge, a scenario to judge, a circuit to trace, or a number to compute. The exam does not test any vendor's SDK syntax.

### D1 Quantum Information Foundations

20% | 16 items

- D1.1 Qubits, superposition and the Bloch sphere
- D1.2 Measurement, probability amplitudes and the Born rule
- D1.3 Entanglement, Bell states and non-locality
- D1.4 No-cloning, teleportation and superdense coding
- D1.5 Density matrices and mixed states
- D1.6 Holevo bound and what n qubits can carry

### D2 Gates, Circuits and Measurement

22% | 18 items

- D2.1 Single-qubit gates: X, Y, Z, H, S, T and rotations
- D2.2 Two-qubit gates: CNOT, CZ, SWAP, Toffoli and controlled phases
- D2.3 Reading and tracing circuit diagrams
- D2.4 Universal gate sets and the Clifford group
- D2.5 Measurement in X, Y and Z bases and mid-circuit measurement
- D2.6 Phase kickback, uncomputation and circuit depth

### D3 Algorithms and Complexity

20% | 16 items

- D3.1 Deutsch-Jozsa, Bernstein-Vazirani and Simon
- D3.2 Grover search and amplitude amplification
- D3.3 Quantum Fourier transform and phase estimation
- D3.4 Shor factoring and period finding
- D3.5 Variational algorithms: VQE, QAOA and barren plateaus
- D3.6 BQP, HHL caveats and the limits of quantum speedup

### D4 Hardware, Noise and Error Correction

15% | 12 items

- D4.1 Superconducting, trapped-ion, photonic and neutral-atom platforms
- D4.2 T1, T2, gate fidelity and coherence budgets
- D4.3 Error mitigation: zero-noise extrapolation and readout calibration
- D4.4 Stabilizer codes, surface code distance and thresholds
- D4.5 Magic states, transversal gates and leakage
- D4.6 Transpilation, routing and the NISQ era

### D5 Programming, Simulation and Hybrid Workflows

10% | 8 items

- D5.1 Statevector, density-matrix, tensor-network and stabilizer simulators
- D5.2 Shots, sampling error and result interpretation
- D5.3 Parameterised circuits and batched cloud execution
- D5.4 OpenQASM and vendor-neutral interchange

D5.5 Noise models and reproducibility practice

D5.6 Annealing versus the gate model

## D6 Post-Quantum Security and Business Adoption

13% | 10 items

D6.1 Harvest-now-decrypt-later and Mosca's inequality

D6.2 NIST FIPS 203, 204 and 205: ML-KEM, ML-DSA and SLH-DSA

D6.3 Hybrid TLS, signature migration and crypto agility

D6.4 QKD and QRNG: what they do and do not solve

D6.5 Evaluating advantage claims and choosing pilots

D6.6 CNSA 2.0 and regulatory timelines

## Continuing education

CQSP is a continuing-education certification. It is valid for 3 years from the date of issue. To renew, log 45 CEUs during the cycle and pay the \$35 annual CE fee before the expiry date, or pass the current version of the exam. Qualifying activities:

- **CertLabz labs, courses and SkillTracker assessments:** Up to 25 CEUs per cycle, 1 CEU per hour
- **Other industry certifications earned or renewed:** 10 to 25 CEUs each, depending on level
- **Conferences, webinars and training:** 1 CEU per hour, up to 20 per cycle
- **Quantum-related work experience:** 3 CEUs per year, up to 9 per cycle
- **Teaching, mentoring, publishing or open-source contributions:** Up to 15 CEUs per cycle
- **College courses in quantum, physics, mathematics or computing:** 10 CEUs per completed course

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<https://certlabz.com/certifications/certified-quantum-systems-professional.html>