

Questions for the examination:

1. What is quantum computing, and how does it differ from classical computing?
2. Explain the concept of qubits and how they are different from classical bits.
3. Describe the principles behind quantum superposition and entanglement.
4. How does quantum parallelism enable faster computation compared to classical computers?
5. What are the components of a quantum circuit?
7. Describe Shor's algorithm and some of its applications.
8. Describe Grover's algorithm, and some of its applications.
9. What is the phase kickback?
10. Discuss the current challenges and limitations of scaling quantum computing systems.
11. Describe the properties of a quantum transformation matrix. What are the reasons for such properties?
12. Give 2 examples of Hilbert spaces good for quantum computing for a circuit with one qubit.
13. Describe the bra-ket notation. Give an example.
14. Why must the vector of amplitudes for a state Ψ be normalized? What are they representing?