Quiz 4

Name: _____ Date: _____ I participated today: _____

1. What size matrix is required to fully describe the transformation a quantum operation has on an n-qubit system?

2. When applying controlled Z, does it matter which qubit is the target and which is the control? In other words, does there exist some state $|\psi_1, \psi_2\rangle$ such that $CZ(\psi_1, \psi_2)$ does not produce the same state as $CZ(\psi_2, \psi_1)$?

3. In digital logic, a set of Boolean operators is *functionally complete* if its members can be used to implement any possible Boolean function. For example, the sets $\{AND, NOT\}$ and $\{NAND\}$ are both functionally complete. Does there exist a functionally complete set of quantum logic gates?

4. In the superdense coding protocol, the sender seems to encode two bits of information into a single qubit. How is this possible?

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