QUIZ - 3

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Graded Quiz • 30 min

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1. Answer [O, X] — 1 point

Schmidt coefficients are invariant under local unitary transformations.

- (•) O
- ( ) X

2. A controlled-Phase gate can be obtained by applying a local unitary transform U to a controlled-NOT gate. The local unitary transform U is ___. — 1 point

- (•) (a) a Hadamard gate H
- ( ) (b) a bit-flip gate X
- ( ) (c) a phase-flip gate Z

3. Consider the following state $|\psi\rangle = \frac{1}{2}(|00\rangle + |01\rangle + |10\rangle + |11\rangle)$. Find two Schmidt coefficients. — 1 point

- (•) (a) $(1, 0)$
- ( ) (b) $(1/\sqrt{2}, 1/\sqrt{2})$
- ( ) (c) $(1/\sqrt{3}, \sqrt{2/3})$

4. A two-qubit state $|\phi^+\rangle = (|00\rangle + |11\rangle)/\sqrt{2}$ is shared by two parties, Alice and Bob. Alice performs a measurement in the computational basis $\{|0\rangle, |1\rangle\}$. Find the ensemble of Bob's state. — 1 point

- ( ) (a) $|+\rangle, |-\rangle$
- (•) (b) $|0\rangle, |1\rangle$
- ( ) (c) $|+i\rangle, |-i\rangle$

5. Consider a Bell-basis measurement $M = \{|\phi^+\rangle\langle\phi^+|, |\phi^-\rangle\langle\phi^-|, |\psi^+\rangle\langle\psi^+|, |\psi^-\rangle\langle\psi^-|\}$. For a two-qubit state $|0\rangle|+\rangle$, find the probability of obtaining outcome $|\phi^+\rangle$. — 1 point

- ( ) (a) 0
- ( ) (b) $1/2$
- (•) (c) $1/4$

***** Extra question: *****

LOCC can create entangled states.

Ans: X