

QUIZ -5

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Graded Quiz • 30 min

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1. [Answer O, X]

1 point

Kraus operators can be negative.

- ☒ O
☐ X

2. For a U_{CNOT} gate, find Kraus operators for the qubit in the first register when a qubit in the second register is prepared in $|0\rangle$.

1 point

- ☒ (a) $\{|0\rangle\langle 0|, |1\rangle\langle 1|\}$
☐ (b) $\{|+\rangle\langle +|, |-\rangle\langle -|\}$
☐ (c) $\{I/\sqrt{2}, I/\sqrt{2}\}$

3. From the Choi-Jamiolkowski isomorphism, find the state that corresponds to the identity map.

1 point

- ☐ (a) $I \otimes I/4$
☒ (b) $|\phi^+\rangle$
☐ (c) $|00\rangle$

4. From the Choi-Jamiolkowski isomorphism, find the quantum channel that corresponds to the state $|\psi^+\rangle$.

1 point

- ☒ (a) $\mathcal{N}[\cdot] = X(\cdot)X$
☐ (b) $\mathcal{N}[\cdot] = Z(\cdot)Z$
☐ (c) $\mathcal{N}[\cdot] = (1-p)(\cdot) + pX(\cdot)X$

5. Compute the following for a state ρ :

1 point

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SS%
\begin{array}{l}
\mathrm{tr}_A[\rho_A \otimes |\phi^+\rangle\langle \phi^+|_{AB}] \\
\end{array}
SS
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- ☐ (a) $I_B/2$
☒ (b) ρ_B^T where T denotes a transpose.
☐ (c) $|0\rangle_B\langle 0|$

**** Extra question: ****

The identity map on quantum states can be viewed as a reduction of an extended map that produces multiple copies of an unknown input state.

Ans: X