

Indian Institute of Science

Quantum Information Theory

Instructor: Shayan Srinivasa Garani

Homework #4, Spring 2025

Late submission policy: Points scored = Correct points scored $\times e^{-d}$, $d = \#$ days late

Assigned date: Apr. 14th, 2025

Due date: Apr. 25th, 2025, 11:59 pm

PROBLEM 1: Compute the mutual information for the following: (a) quantum dephasing channel with parameter p and (b) quantum erasure channel with parameter ϵ . (20 pts.)

PROBLEM 2: Prove that the coherent information $Q(\mathcal{N}_1 \otimes \mathcal{N}_2)$ of a tensor product channel $\mathcal{N}_1 \otimes \mathcal{N}_2$ is never less than the sum of coherent informations over individual channels. (10 pts.)