

Weekly Problem Set #3 – Week 3

PLEASE SHOW ALL YOUR WORK FOR FULL CREDIT. Showing your work includes writing out intermediate steps in ways that others can understand or writing sentences that help to communicate your assumptions and logic. If you utilize any software tools or apps (e.g. Mathematica, Desmos, ChatGTP, etc.), you must transparently acknowledge your use of them in your HW submission. A subset of these problems will be graded for correctness. The rest of the problems will be graded for effort.

Part 0: Bloch Sphere Mapping

Question 1 (6 pts). (Wong E2.14). Explain your reasoning and justify your answers.

Question 2 (6 pts). (Wong E2.15). Explain your reasoning and justify your answers.

Question 3 (6 pts). (Wong E2.17). Explain your reasoning and justify your answers.

Part 1: Awareness of Physical Platforms for Qubits

Question 4 (4 pts). (Wong E2.18). **Find a link to a PDF of the Nature article in the ELMS assignment description**

Question 5 (4 pts). (Wong E2.21).

Part 2. Quantum Gates

Question 6 (6 pts). (Wong E2.23). Explain your reasoning and justify your answers.

Question 7 (6 pts). (Wong E2.25). Explain your reasoning and justify your answers.

Question 8 (4 pts). (Wong E2.26). Explain your reasoning and justify your answers.

Question 9 (4 pts). (Wong E2.30). Explain your reasoning and justify your answers.

Question 10 (6 pts). (Wong E2.33). Explain your reasoning and justify your answers