Paper Assignment. Due Tuesday May 5.

(a) Choose one of the following topics and respond to it in an essay of no less than 5 pages and no more than 7 pages (not including title page and bibliography). Your paper should be typed, 10- or 12-point, double-spaced and spell-checked.

(b) Your essay should conform to the guidelines for writing philosophy papers handed out in class. Make Absolutely Certain that you have read and understood these guidelines before you attempt to begin writing your paper. Please submit both a hard-copy in class on the due date, and an e-copy to SafeAssign. Make sure to retain an extra copy for your own records.

(c) Your essay must include a bibliography with at least 2 entries (minimally, the class texts). Your essay must use this bibliography as a source to cite for all claims and quotes you attribute to authors.

(d) Lecture notes should NOT be listed and/or referred to in your essay. Lecture notes merely summarize topics in the texts or related material. Online websites that have not been peer-reviewed should NOT be listed and/or referred to in your essay. This encompasses (but is not limited to) online lecture notes, personal websites, and Wikipedia. If you find an online source that you'd like to use, but are in doubt whether it is legitimate, please email me for advice.

(e) Please make use of Poly's Writing Center <www.poly.edu/academics/support/polytechnic/writing> if you have trouble with spelling and/or grammar. If your essay contains so many spelling/grammatical errors that a reader cannot comprehend what your claims are, then your grade will suffer.

(f) Late paper policy: Late papers will be accepted but will be given an initial penalty of a third of a grade point, and a further penalty of a third of a grade point for every period of 4 days after the due date. Example: An A paper turned in one day late will receive an A-; an A paper turned in 4 days late will receive a B+; an A paper turned in 8 days late will receive a B; etc. Late papers will not be accepted after 5 pm on the date of the final.

1. Quantum mechanics and classical mechanics differ crucially in how they represent three key physical concepts: the state of a physical system, the properties of a physical system, and the values of the properties of a physical system. Explain what these concepts are, how quantum mechanics and classical mechanics differ in representing them, and some of the consequences of this difference.

2. What is involved in quantum teleportation? Explain both its theoretical and experimental bases.

3. What are the prospects for quantum computers? How would they be different from classical computers?

4. The "Schrödinger's Cat" thought experiment points to an aspect of quantum mechanics that many find troubling. What is that aspect? How might we seek to escape it?

5. In interpreting quantum mechanics, it is not the case that "anything goes". First explain why anyone should be concerned with interpreting quantum mechanics. Then explain in detail what sort of constraints are imposed on any attempt to interpret quantum mechanics.

6. Pick one of the following interpretations of quantum mechanics and describe its basic tenets. Then explain how it addresses the following constraints on interpretations: Bell's Theorem, the Kochen-Specker Theorem, the Measurement Problem. In your opinion, is it successful?

   - Many Worlds
   - Many Minds
   - GRW
   - Bohm's Theory
   - KHS Modal
   - Quantum Logic
   - Consistent Histories

7. Advocates of decoherence claim it solves the Measurement Problem. Explain what their argument is and critically analyze it.