

For the Final Exam, I will choose FIVE of the following questions. You must answer any THREE. If the question is based on one of the student presentations, you may NOT answer that question. **Your answers should be 500 ~ 1,000 words, limited to 2 ~3 Word or PDF pages.** Essays will be graded on the assumption that you have written out answers to *all* of the questions ahead of time. Use of external reference materials is strongly encouraged.

- 1) Science students are taught that science is independent of politics. Is this true? Was the success of **Lysenkoism** in the Soviet Union attributable to the nature of the Soviet system in contrast to that of Western countries? Does Western science support the capitalist system? Compare and contrast the arguments for and against.
- 2) Is the use of **microscopes** to address biological questions a consequence of technological advances in microscopy, or is their development driven by the needs of biologists for the necessary technology to answer their questions? Compare and contrast the arguments for and against.
- 3) Leeuwenhoek observed '*animalcules*' including bacteria through his microscope in the 17th century, yet no connection between microorganisms and disease was made until the 19th century. Offer and defend a theory why this is so.
- 4) The **Germ Theory of Disease** develops quite late, and requires a fair amount of time to be fully accepted by the medical community. Offer and defend a theory as to why this is so. Do the **films about Pasteur and Ehrlich** offer insights?
- 5) Compare and contrast the thinking and goals behind positive and negative **eugenics**. How were the US and Canadian sterilization laws used as an instrument of negative eugenics? With 21st century knowledge of genomics, do any **positive eugenic** goals remain possible and (or) desirable in the 21st century?
- 6) Compare and contrast the theories of **Vitalism & Reductionism** as theories of the development of living beings. How does the original distinction between Organic and Inorganic chemistry related to this?
- 7) Redi and Pasteur conducted historical experiments to disprove **Spontaneous Generation**. Summarize the experiments, noting in particular the Control experiments in each. What objections can be raised to these "*proofs*"?
- 8) Solution of the biological problem presented in the film "**Andromeda Strain**" requires an appreciation of blood chemistry: discuss acidosis and alkalosis. How do these explain "*Why an aging sterno drinker is like a new-born baby?*" The vultures survive even when they eat the dead humans in Piedmont: Why are the birds important?
- 9) Are **Nobel prizes** awarded for a single major discovery, and (or) for a body of work over time? Give examples of each from material presented in the course. Does this change perspectives on perceived "*injustice*" in some awards (or lack thereof)?
- 10) What the concept of **Presentism** in ethics? Discuss some examples of how experiments in the Past are viewed differently in the Present. What should be done with the knowledge gained from such experiments?