Final Exam due May 22, 2014 Phsc/Hist 107

turn in to my office, Seq. 438 no later than 2:45 P.M.

Please answer the questions in your blue books. Answer each question as completely as you can. Partial credit will be given for partially correct answers. Each question is worth 25 points, and you must answer at least four of them. If you answer more than the minimum number, then only your best answers will be counted.

As this is a take-home test, I will be carefully examining answers for signs of plagiarism from on-line sources.

1) How did Galileo's approach to scientific experimentation differ from that of Newton?

2) Organize each of the following concepts into one of four categories: Fact, Hypothesis, Law, Theory. Justify your reasoning for placing each concept into its proper category.

A) epicycles; **B)** dropped objects fall downwards; **C)** magnets produce magnetic lines of force; **D)** planets move on elliptical orbits, with the Sun at one focus; **E)** matter is composed of the four elements – earth, air, fire, water; **F)** the Milky Way is composed of many thousands of tiny, faint stars.; **G)** when light passes through a prism, all the colors of the rainbow come out.

3) What role did Johannes Kepler play in the triumph of heliocentrism over geocentrism? *Why were his contributions so important?*

4) Which of the scientists we've discussed this semester would be most likely to agree with the Deist idea of God as a Divine Clockmaker, who constructs his Creation and then sets it in motion with little or no direct interference thereafter? Make sure you justify your choice using examples or ideas from that scientist's work.

5) Consider the idealized version of the scientific method as we discussed it in section 1 of the course. Describe how Maxwell's work on electromagnetism fits into the scientific method.

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6) Is the current allocation of funding for basic research by the Federal government a good one? If the total amount of science funding is fixed, would you how much of that fixed money goes to any particular branches of science? If so, justify your choices. If not, explain why the current distribution is fair.

7) Although the ancient Greeks in many ways appear to have originated science as we currently think of it (for example, rejecting supernatural explanations for natural events) there are still large differences between their way of doing science and our modern way. Describe these differences in as much detail as possible.

8) What are the similarities between the early attempts by Planck to explain the blackbody spectrum and Maxwell's early efforts to explain electromagnetism?