

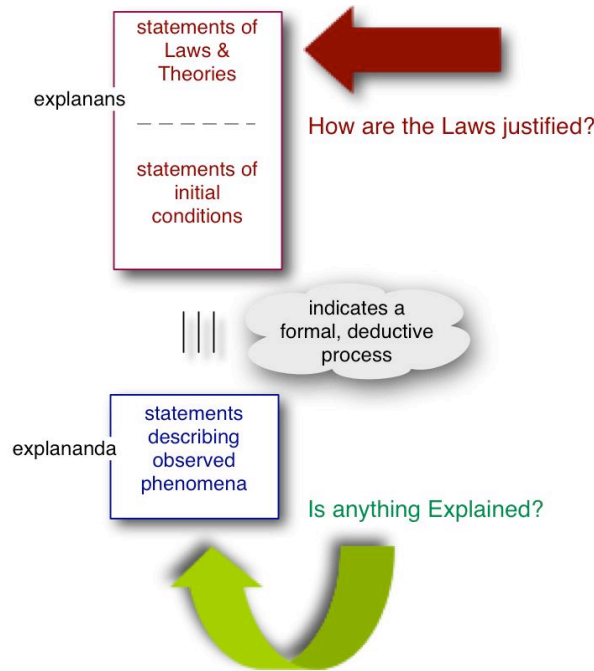
Name: _____

Midterm Exam Short Answer – total 40 pts.

- Use a separate bluebook and mark the front of it: “Short Answer” (um, along with your name).
- Short answers...sentences, diagrams, are encouraged where useful. Be legible. Be correct. Be cool.

A. SCIENTIFIC KNOWLEDGE (9PTS)

1. (2pts) Given what you’ve seen so far and what we talked about near the beginning of class, please describe...Science. Bullets are fine.
2. (1pts) What is Scientific Realism?
3. (2pts) Popper turned the program of the logical empiricists on its head: to what does this refer?
4. (2pts) What is meant by the Theory Ladenness of scientific observation?
5. (2pts) Here is a cartoon of the Deductive-Nomological method of Explanation. What were some of the major problems with this approach (think “birth control”)?



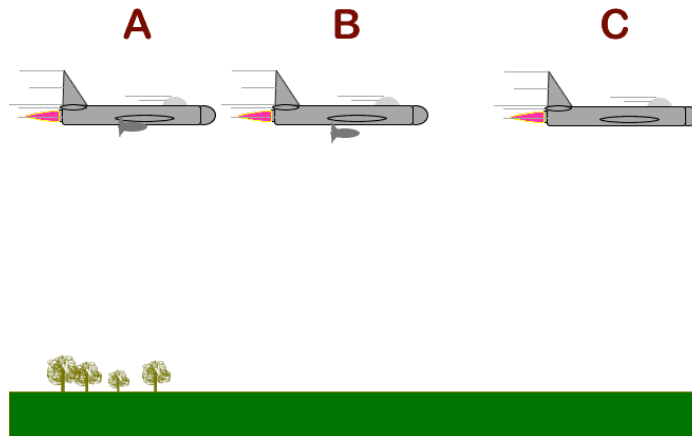
B. GREEKS (10PTS)

1. (2pts) One of Plato’s research programs was the reconciliation of what aspects of the two philosophies of Hericlitus and Parmenides?
2. (2pts) How did Aristotle work out a compromise in cosmology for these two approaches?
3. (2pts) Describe Plato’s theory of Forms. How might it relate to physics or mathematics?

4. (2pts) Describe the cosmology of Pythagoras.
5. (2pts) What did Aristotle think about the possibility of a vacuum and how did his theory of motion support this idea?

C. MIDDLE AGES THROUGH RENAISSANCE (10PTS)

1. (2pts) What were some of Tycho Brahe's major professional contributions?
2. (2pts) Describe the motion of an ideal projectile...and a real projectile. What are the differences? Certainly a picture might help.
3. (2pts) What were some of the reasons that we consider Galileo such a major figure in the history of physics? Include method as well as actual scientific discovery.
4. (2pts) What are Kepler's three laws again?
5. (2pts) Imagine a bomber releasing a bomb as below. At position A, the bomb is attached, in B, it is just released. Draw in where the bomb might be at position C according to both Galileo (mark an X) and according to Aristotle (mark an O). What were the differences between their views in this regard?



D. DESCARTES AND NEWTON (11PTS)

1. (2pts) What do we mean when we say that Descartes was a materialist?
2. (2pts) Which of Newton's three "laws" was original with him? Give an example that illustrates this law (pictures are encouraged). Think of something different from the example that I used in class.
3. (2pts) What unique extension to the binomial expansion is due to Newton?
4. (2pts) What is centripetal force?
5. (3pts) Imagine an archer using a bow and arrow. Imagine that the bow provides a constant force to the arrow, regardless of the pull...in terms of impulse, explain why one pulls the string as far as possible to shoot the arrow and what the effect of that is, as compared with only pulling a little bit.