PHIL/HPS 83801 Philosophy of Science Fall 2009 Professor Don Howard

Final Examination Study Questions

Logical Empiricism, Neo-positivism, Explanation, Laws, and Confirmation

1.What was the protocol-sentence debate all about? Be sure to explain the positions of Otto Neurath and Moritz Schlick.

2. What is the deductive-nomological (D-N) or covering-law model of explanation?

3. Give examples of (a) deductive, (b) statistical or probabilistic, (c) functional or teleological, and (d) genetic explanations. How might one argue for the claim that the deductive pattern of explanation represents the ideal toward which one should strive in all scientific domains?

4. What is meant by a "causal" law? Is it reasonable to insist that all acceptable scientific explanations make use of causal laws?

5. Some would argue that scientific laws are distinguished from accidental generalizations by virtue of the fact that laws support corresponding subjunctive conditionals whereas accidental generalizations do not. Explain this argument and then outline the more important issues involved in assessing the argument.

6. Contrast Hempel's satisfaction criterion of confirmation with the Nicod criterion. How serious a challenge is posed to each by the paradox of the ravens?

Critiques of Logical Empiricism

7. Give a sketch of Dretske's critique of the Humean notion of scientific law and his argument for a metaphysical analysis of laws.

8. What is Goodman's "New Riddle of Induction" and why does it represent a challenge to logical empiricism? What is Goodman's own solution to the "New Riddle"?

9. Sketch Quine's critique of the analytic-synthetic distinction as developed in "Two Dogmas of Empiricism." How might a defender of analyticity respond to Quine's critique?

10. Quine's "two dogmas" are the analytic-synthetic distinction and what Quine terms "reductionism." What is the latter, and why does Quine think that "the two dogmas are, indeed, at root, identical"?

11. Describe Quine's conception of a naturalized epistemology. Outline his argument for this position.

12. Some would argue that any version of epistemological naturalism is guilty of a vicious circularity because it employs, as tools, some of the very same scientific theories that it aims to investigate. Quine seeks to sidestep this objection by disavowing any justificatory ambition for epistemology. What is your view?

Kuhn's Structure of Scientific Revolutions and the Critical Reaction to It

13. What, according to Kuhn, are the chief characteristics of the pre-paradigm stage in the development of a science? Would it be fair to say that sociology is still in the pre-paradigm stage? Can you think of another "science" that might be held to be in the pre-paradigm stage?

14. What are Kuhn's reasons for maintaining that the paradigm disputes typical of revolutionary science are not wholly rational? Are there any shared beliefs or values to which the advocates of competing paradigms can retreat in trying to settle their differences?

15. Explain, briefly, why Kuhn's model of the development of science constitutes a fundamental challenge to some of the basic assumptions that underlie the logical empiricist picture of both the nature of science and the task of the philosophy of science.

16. In response to the prodding of his critics, Kuhn developed a view of the nature of paradigms that is more refined than that presented in the first edition of *The Structure of Scientific Revolutions*. First, explain why he thought that we needed a straightforwardly sociological criterion of membership in a scientific community, and summarize his proposal for such a criterion. Second, explain what he meant by the concept of a "disciplinary matrix," the concept that took the place of the paradigm concept.

17. Compare and contrast Kuhn's model of scientific change with Popper's.

18. In your opinion, is it possible to maintain some conception of scientific rationality consistent with Kuhn's basic model of the development of science?

Realism and Anti-realism

19. Why is it so important for instrumentalists to defend a strong theory/observation distinction? You might want to use the Craig elimination theorem in explaining your answer.

20. Explain Maxwell's "continuum of size" and "continuum of observational means" arguments. What are they supposed to establish?

21. Explain McMullin's argument for "structural realism" and Hacking's argument for "entity realism."

22. Give a brief characterization of van Fraassen's "constructive empiricism" (remember to define carefully the concept of "empirical adequacy") and then explain how it differs from both instrumentalism and realism.

23. What is the so-called "ultimate argument" for scientific realism? What is van Fraassen's main criticism of it?

24. What is Fine's "Natural Ontological Attitude" program? How does it differ from both realism and instrumentalism?