

Mid-term Examination

General Directions: This examination is divided into three sections of four questions each. You are to answer a total of four questions, choosing at least one from each section.

The Historical Background to Logical Empiricism

1. Sketch the developments in the foundations of geometry in the nineteenth century that had a bearing on the development of logical empiricism.
2. Sketch the kind of argument that Pierre Duhem employed to motivate his brand of conventionalism. In what sense is Duhem's conventionalism a species of epistemological holism?
3. There are at least two ways of interpreting Ernst Mach's philosophical program, one that emphasizes the phenomenalist moment in his thinking and one that emphasizes the historical-critical and biological-economic moment. Describe these two readings of Mach and the evidence supporting each.
4. The task confronting logical empiricists in the early 1920s is said to have been that of developing a new form of empiricism capable of defending the empirical integrity of Einstein's general theory of relativity in the face of neo-Kantian reactions to relativity. What was the issue under debate here?

The Vienna Circle and Its Friends

5. Hans Reichenbach's first book, *Relativitätstheorie und Erkenntnis Apriori*, advanced a novel point of view about the a priori. What was that view? Is it a reasonable extrapolation from Kant? Is it a reasonable response to general relativity's challenge to Kant?
6. Otto Neurath and the other members of the "left wing" of the Vienna Circle disagreed with the "right wing" about both the structure and empirical interpretation of scientific theories and about the place of social and political values in theory choice. What were these differences and how were the two debates connected with one another?
7. What is the verifiability criterion of meaningfulness? What problems is it supposed to solve? What are the chief difficulties with the criterion?
8. In his 1924 book on the axiomatization of relativity theory, Reichenbach emphasizes the point that, if the only differences between empirically equivalent theories are localized to different choices of conventional coordinating definitions, then those differences are no more significant than the difference between using French or German or the difference between using English or metric units. Two such "different" theories are really just different ways of saying one and the same thing. Is this a good argument?.

Do Some Philosophy

9. Is scientific realism compatible with the view that theory choice is underdetermined by evidence?
10. Early logical empiricists and philosophers of science in the Marburg neo-Kantian tradition redirect epistemology to the analysis of scientific theories rather than – at least in the first instance – first-person, individual cognition. In your opinion, is this a sensible move?

11. A corollary to Gödel's first incompleteness theorem is that all first-order theories as powerful as or more powerful than elementary Peano arithmetic will be non-categorical, meaning that they will not determine for themselves a class of models all of the members of which are isomorphic to one another. We spoke in class about how this result may be read as implying the failure of the Marburg program. More generally, one often takes this to point to limits on the ability of theory to capture reality and, perhaps, as occasioning some deep questions about realism itself. On the other hand, one could also read it as implying that Hilbert was wrong in saying that to think clearly is to think axiomatically, or that one is wrong to press formal methods too far in epistemology. What do you think?

12. Neurath argued that there is a proper role for social and political values in theory choice. So, too, have some contemporary feminist philosophers of science, some of them, such as Helen Longino, adducing arguments strikingly like those of Neurath. Others worry that allowing a role for social and political values in theory choice necessarily compromises the objectivity of science. What is your view?