

Study Questions for Mid-term Examination

The Historical Background to Logical Empiricism

1. Why do empiricists traditionally have a problem explaining the nature of mathematical truth?
2. Sketch the developments in the foundations of geometry in the nineteenth century that had a bearing on the development of logical empiricism.
3. Sketch the kind of argument that Henri Poincaré employed to motivate his brand of conventionalism. What did Poincaré mean when he wrote that conventions are “disguised definitions”?
4. 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?
5. 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.
6. Recent scholarship emphasizes logical empiricism’s debt to the Marburg neo-Kantian tradition. After briefly outlining the development of that tradition, describe some of the specific neo-Kantian influences on the early development of logical empiricism.
7. 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?
8. In what ways do the logicist (Frege–Russell) and formalist (Hilbert) programs in the foundations of mathematics represent challenges to the Kantian view of the nature of mathematical truth?

The Vienna Circle and Its Friends

9. Moritz Schlick was well known in his pre-Vienna Circle days for advocating a “semiotic” theory of truth as “univocal” or “unambiguous” (“*eindeutige*”) coordination or correlation between proposition and fact. Explain what Schlick meant by the semiotic view of truth and contrast this view with both correspondence and coherence views of truth.
10. 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?
11. In the 1920s, two views emerged within the Vienna Circle regarding (a) the role of conventions in scientific theories and (b) the empirical content of scientific theories. We termed these views “epistemological holism” and (for want of a better term) “epistemological atomism.” Explain and contrast these two views.
12. 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?

13. What is the verifiability criterion of meaningfulness? What problems is it supposed to solve? What are the chief difficulties with the criterion?

14. Schlick criticized Reichenbach's assertion that contingent a priori coordinating principles play an essential role in empirical science, suggesting that those elements of theory are more helpfully described as, in effect, conventional coordinating definitions. What might be the important philosophical issues at stake in a debate over these two different(?) ways of regarding the basic links between theory and world?

15. In his essay, "The Lost Wanderers of Descartes and the Auxiliary Motive," Neurath deliberately chooses the psychological language of "motives," as opposed to talking about "reasons" or even just "assumptions" in characterizing those elements of theory that are not obviously either empirical or a priori. Why? What are the large, metaphilosophical issues on the table here?

16. 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

17. What is your view of the nature of mathematical truth?

18. The young Hans Reichenbach argued that a contingent a priori played a significant role in scientific cognition. More recently, Michael Friedman has made Reichenbach's notion of the contingent a priori the starting point of his own attempted Kant revival. Assess the prospects for success of such a program.

19. Is scientific realism compatible with the view that theory choice is underdetermined by evidence?

20. 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?

21. Generally speaking, neo-positivism took as its aim the formal (perhaps even purely syntactical) definition of core methodological concepts and assumed that such definitions would have normative force across a variety of scientific disciplines. In your opinion, is this a reasonable way to conceive the task of a philosophy of science?

22. 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?

23. It is often alleged against Neurath, Quine, and other holists in epistemology that, because it is committed to a coherence theory of truth, epistemological holism devolves into an anything-goes relativism. Is this a fair and accurate criticism?

24. 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?