

Philosophy of Science

Study Questions for Exam II

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1. From Nicholas Maxwell's paper, "Popper, Kuhn, Lakatos and Aim-Oriented Empiricism," explain his criticisms of Popper.
2. According to Maxwell, what is standard empiricism? What are the problems with standard empiricism? Do you agree with Maxwell's critique?
3. What is Maxwell's aim-oriented empiricism? How does aim-oriented empiricism address the problems with standard empiricism?
4. What is the difference between Maxwell's Philosophy of Knowledge and Philosophy of Wisdom? What does he mean by 'wisdom'? Do you agree with Maxwell's argument that science should broadly be concerned with wisdom rather than a narrowly focused pursuit of knowledge and technological know-how?
5. What is Maxwell's concept of rationalistic neurosis? Give an example. Would you agree or disagree? Why?
6. Critically evaluate Maxwell's philosophy of science.
7. What is the traditional conception of scientific method and how did it originate in the 17th century? Explain. Are there problems with this notion?
8. Explain Hume's argument regarding causation. What is the relevance of Hume's conclusion for scientific inquiry? Give examples from science to illustrate Hume's problem.
9. Can you think of a counter-example that decisively refutes Hume's argument regarding causation? Is his argument plausible?
10. Explain the two fallacies, *post hoc ergo propter hoc* and *cum hoc ergo propter hoc*. What is the relevance of these fallacies to Hume's analysis of causation?
11. From the selection taken from *An Inquiry Concerning Human Understanding*, explain Hume's problem with induction. What is the basis of Hume's problem? Explain his argument and its implications for scientific method. Is he correct?
12. Hempel, in his *Philosophy of Natural Science*, says that "the maxim that data should be gathered without guidance by antecedent hypotheses about the connections among the facts under study is self-defeating, and it is certainly not followed in scientific inquiry. On the contrary, tentative hypotheses are needed to give direction to a scientific investigation." Explain how Hempel's view constitutes a challenge to the traditional

conception of scientific method. What example does he use to illustrate his point? Is this example used correctly? Why does he think that his hypothetico-deductive method is superior to what he calls the “narrow inductivist approach”?

13. From Popper’s *The Logic of Scientific Discovery*, explain the relevance of the deductive form, *modus tollens*, for his method of conjecture and refutation. In what manner does Popper agree with Hempel? Does Popper agree or disagree with Hume?

14. Explain what Duhem means by “the experiment does not tell us where the error lies”? How does this idea contrast with the Baconian idea that a crucial experiment would unambiguously favor one or the other of two competing hypotheses under test?

15. Explain the contrast between Popper’s method of conjecture and refutation and the Quine-Duhem thesis of underdetermination of theory. How is the underdetermination thesis related to holism and why does this view challenge Popper’s view of falsifiability? Which view do you think is correct? Explain.

16. What is pragmatism? How does pragmatism differ from realism or absolutism with respect to the advance of scientific knowledge? Do we create truth or discover it? Explain with respect to the underdetermination of theory.

17. Are there any problems with the underdetermination of theory? Explain using examples from the history of science.

18. According to McHenry, what is the relevance of Popper’s view of rigorous science to the current “crisis of credibility” in academic medicine? What is the “crisis of credibility” and what is the source of this problem?

19. What is “evidence-based medicine”? How is evidence-based medicine challenged by the current commercial approach to clinical research?

20. Explain McHenry’s critique of ghostwriting in “Of Sophists and Spin-doctors.” What is ghostwriting? Is this a problem for constructing a reliable body of medical knowledge? Why?