

***Study Questions for Final Examination*****Induction, Evidence, and Confirmation**

1. Give an outline of Karl Popper's critique of induction.
2. Carl Hempel places great weight on variety of evidence as a criterion of confirmation. But it is not always obvious how this criterion is to be deployed. Explain, with examples, why there might be a problem in formulating a unitary criterion of variety.
3. Which kind of evidence provides greater empirical support for a theory: successful explanations of previously observed phenomena or successful predictions of heretofore unobserved phenomena?
4. Explain the difference between subjective and objective interpretations of probability. What bearing does this distinction have on the problem of confirmation?
5. Explain what Bayes's theorem says, as a theorem in the probability calculus, and then show how it is used by contemporary Bayesians as a novel approach to the problem of confirmation.
6. Wesley Salmon claims that the proper employment of Bayes's theorem can address some of the central challenges posed by Thomas Kuhn's model of paradigm conflict. Critically evaluate this claim. Be sure to explain how Salmon uses Bayes's theorem in a manner different from that in which it is used by most Bayesians.

**Explanation and Laws of Nature**

7. What is the "deductive-nomological" or "covering-law" model of explanation? How does it differ from the "inductive-statistical" model of explanation? Be sure to give concrete illustrations of both patterns of explanation.
8. How might one distinguish mere accidental generalizations from genuine law-like regularities? As a part of your answer, be sure to explain and evaluate the proposal that genuine laws support corresponding subjunctive conditionals.
9. Are laws necessary for explanation? Compare the answers to this question given by Rudolf Carnap and David-Hillel Ruben.
10. What is the "Humean" or "regularity" view of laws? How is this view of laws connected with David Hume's famous critique of induction?
11. Why does Fred Dretske think that the regularity view of laws is inadequate? Give a sketch of his alternative analysis of laws in terms of real universals.
12. How does the problem of so-called "vacuous" laws pose a challenge to metaphysical analyses of laws in terms of either real universals or possible worlds?

## **Realism and Anti-realism**

13. Explain why the kind of anti-realism that grew up within the empiricist tradition typically requires the assumption of a strict distinction between theoretical terms and observational terms or between unobservable and observable entities. Illustrate your account with a sketch of the Craig elimination theorem.
14. Summarize Grover Maxwell's main criticism of the idea that one can distinguish sharply between observable and unobservable entities, that contained in what we called his "continuum of observational means" argument. What is the gist of Bas van Fraassen's response to this argument?
15. What does Bas van Fraassen mean by "empirical adequacy"? In your answer, be sure to show how this concept is rooted in van Fraassen's commitment to the semantic view of theories. Be sure, as well, to explain the difference between what the constructive empiricist is committed to in asserting that theories aim for empirical adequacy and what the realist is committed to in asserting that theories aim for truth.
16. Many of the authors whose essays we read discussed the argument for scientific realism based upon the explanatory success of scientific theories. State and defend an opinion about the soundness of this argument. In your answer you must discuss critically the views of at least two of the authors whose essays touched upon this issue.
17. Describe and critically evaluate Ian Hacking's "entity realism."
18. What is Arthur Fine's NOA program?

## **Other Topics; Do Some Philosophy**

19. Recall the arguments of Pierre Duhem and W.V.O. Quine for the underdetermination of theory choice by empirical evidence. After sketching those arguments, critically evaluate the implications of underdetermination for the question of scientific realism.
20. In discussing the relevance of new test predictions in assessing the empirical warrant for a theory, Carl Hempel writes: "From a logical point of view, the strength of the support that a hypothesis receives from a given body of data should depend only on what the hypothesis asserts and what the data are: the question of whether the hypothesis or the data were presented first, being a purely historical matter, should not count as affecting the confirmation of the hypothesis." Critically discuss the assumption underlying this remark, namely, that questions of scientific method are purely logical questions of such a kind that historical considerations should have no bearing.
21. If one follows Arthur Fine's lead in going "back to the laboratory," is there a meaningful sense in which one can still be said to be doing the philosophy of science?
22. Some contemporary sociologists of science, known as "social constructivists," argue that all scientific theories are social constructs, driven less by considerations of logic and evidence and more by considerations of class, gender, and race. Thus, some would argue that the assumption of gender dimorphism is a social construction corresponding to no objective or real distinction in nature. Some social constructivists argue that Thomas Kuhn "made the world safe for social constructivism," meaning that his having argued for the relevance of "extra-rational" criteria of theory choice opened the door for their still more radical critical

perspective on science. Many realists, one is not surprised to learn, repudiate radical social constructivism. Given what you have learned this semester, state and defend a position on social constructivism in the philosophy of science.

23. In the Middle Ages, “realism” meant a belief in the existence of real universals. The point of view that denied their existence was called “nominalism.” We have seen philosophers like Dretske criticize Hume, the father of empiricism in the philosophy of science, for their failure to acknowledge the existence of real universals. Some thinkers, most notably the nineteenth-century American philosopher Charles Sanders Peirce believed that there was a deep connection between realism about universals and scientific realism. The question is, then, does realism about universals entail scientific realism or vice versa?

24. Many philosophers of science make a distinction between the “context of discovery” and the “context of justification.” We discussed this distinction from the point of view of its role in relegating non-epistemic considerations to the context of discovery. But the distinction is important for another reason, namely, for the purpose of claiming that while there might be a logic of confirmation, there is no logic of discovery, the idea being that there can be no rules governing the process whereby new scientific ideas are invented. Critically evaluate this claim. Do you believe that scientific discovery is, thus, not guided by a logos (if not also a telos)? Be sure to include in your evaluation a comment on the argument that if the proponents of artificial intelligence succeed in teaching a computer to emulate human intelligence in every last respect, then the rules governing the behavior of that computer will, in effect, include a logic of discovery.