Reasoning in the Sciences
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Review for Exam

1. Explain the difference between deductive and inductive arguments.
2. How are deductive and inductive reasoning relevant to the pursuit of scientific knowledge?
3. What is the traditional conception of scientific method? What are the problems associated with this conception? Does Hempel's or Popper's alternative conception more accurately describe the actual method of science? Why or why not?
4. What is scientific method? Why is Galileo mainly credited with the discovery of scientific method?
5. What was Galileo's critique of Aristotle? Explain the difference between teleological and mechanical explanations of natural phenomena.
6. Why are Hempel and Popper skeptical about the role of induction in traditional scientific method?
7. Explain the relevance of the *modus tollens* form for the testing of a scientific hypothesis or theory?
8. Why do philosophers of science argue that science can never prove theories true? What reasons do they offer for this claim? Are they correct?
9. Define the following: model, hypothesis, theory.
10. Explain the difference between a scale and analog model.
11. What is the difference between an empirical and a theoretical hypothesis? Is there a problem with this distinction?
12. What is the difference between a realist and social constructivist view of science?
13. What is a good scientific theory?
14. What is unification? Why is this an important feature of a good scientific theory? Give examples.
15. What is Popper's distinction between science and ideology? What is the relevance of this distinction?
16. What is Popper's problem of demarcation? Did he solve the problem with his criterion of falsification?
17. Why is Popper's distinction between confirmation and falsification? Why does he think that the latter rather than the former is the essence of rigorous science?
18. Explain one criticism of Popper.
19. Is it possible to construct a set of necessary and sufficient conditions to identify pseudoscience? Why or why not?
20. What is pseudoscience? How is it different from corrupted science or 'junk' science?
21. What is the purpose of Giere's six step program for the evaluation of science? Is he successful?
22. Explain one of the 'marks of pseudoscience' and give an example.
23. How is science corrupted by commercial interests? Give an example.