

***PHI 030: Introduction to Philosophy of Science***  
*shamiller.net/phi030/lecture-materials.php#week5*  
**Study Guide 1**

## About the Test

The test covers all readings, lectures, lecture materials, handouts, and class discussions through April 29. All lecture materials and handouts are on the course website at <http://shamiller.net/phi030/lecture-materials.php>. Most are in Google Doc form, so you can copy and paste them into your own documents.

**You will need to bring a Blue Book on test day, which is May 6.**

The test consists of:

- **9 multiple choice** questions worth 1 point each (9 points)
- **8 short answer** questions (1-3 sentences) worth 2 points each (16 points)
- **2 extra** questions worth 1 point each (2 points)

Partial credit will be given for short answer questions. Always select the best answer on multiple choice questions, which is also the one that is supported by readings, lecture materials, handouts, and discussions. The fact of an option being *true* does not make it correct. E.g., all the options to the Popper-Freud question below are more or less true statements, but only option 3 is the correct answer. It also happens to be a direct quote from the Okasha reading. Questions are not meant to trick you, but they require that you read and think carefully.

- **Multiple Choice Example:** What was Karl Popper's criticism of Sigmund Freud's psychoanalytic theory?
  1. Psychoanalytic patients were typically wealthy, which raised the specter of bias
  2. The Oedipus Complex is based in Greek Mythology, which is literature, not science
  - 3. The theory could be reconciled with any empirical findings whatsoever ✓**
  4. Freud was trained as a medical doctor, not as a scientist
  5. Freud abused cocaine, which is known to impair judgment

- **Short Answer Example:** John Ziman claims that “scientific research is a social activity.” What conclusion does he draw from this about how we must study and understand the nature of science?

**Answer:** We must study how scientists interact and communicate, and how they are organized. We must understand the roles scientists play within a system of knowledge. (From *Introductory Readings in the Philosophy of Science*, pp. 51-52). [See section What You Should Know below.]

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## What You Should Know

This study guide encompasses more than the test will. One strategy is to use your group Google Doc to work through the study guide. Two general points: (1) The items below don't necessarily have simple one word---or even short---answers, especially when you are directed to 'understand' some issue or concept. (2) Material that is most likely to look new or unfamiliar will probably be from portions of the readings that we didn't cover in detail in class. Part of the point of this study guide is to steer you back to those passages prior to the test, but they are passages that you have already read. Good luck!

1. Know Auguste Comte's ordering of the sciences.
2. Understand the relationship between the multiverse hypothesis and the issue of what is science. (This comes from the in-class video, which is linked under 'Lecture Materials'.)
3. Know the three *kinds of answers* that can be given to the question of what is philosophy.
4. Know the three definitions of scientific theory presented in lecture.
5. When Socrates scores the only goal in the *Monty Python* video, Hegel argues "that the reality is merely an a priori adjunct of non-naturalistic ethics." Kant "via the categorical imperative is holding that ontologically [the goal] exists only in the imagination." What is Marx's objection?
6. In the *Monty Python* video, why was Franz Beckenbaur a surprise addition to the German team?
7. Know the number of particles and the number and names of the forces postulated by the Standard Model in physics (according to CERN).
8. What observed phenomena has led scientists to hypothesize the existence of dark matter and dark energy? How are they supposed to address the problem?

## **Okasha**

9. Understand criticisms of Popper's demarcation view from the Okasha reading.
10. Know Okasha's proposed list of methods that are distinctive of science.
11. From the Okasha, understand Newton's importance to the scientific revolution.
12. Know what Okasha takes to be the principal task of the philosophy of science.
13. From the Okasha, explain how Ludwig Wittgenstein's concept of a 'game' addresses the problem of science being a heterogeneous activity.
14. Know the date of publication of Charles Darwin's *The Origin of Species*.

## **Ziman**

15. Know what John Ziman means when he says science is a practical art and a social activity. Also know what Ziman sees as distinctive of scientific knowledge.
16. Know why Ziman thinks Robinson Crusoe could not be a scientist or a lawyer while stranded on the island.
17. Know what quality or feature that science, religion, law, and philosophy share, according to Ziman.
18. Know how Ziman characterizes scientific arguments.
19. Understand why Ziman thinks that we should not make a sharp distinctions among science as a body of knowledge, science as what scientists do, and science as a social institution.
20. According to Ziman, understand what recognizing that scientific knowledge is sensible allow us to do.

## **Popper**

21. Understand Popper on falsifiability and his specific criticisms of pseudo sciences.
22. According to Popper, how did Sir Arthur Eddington's 1919 experiments show why Einstein's general theory of relativity is such an exemplary scientific theory?
23. Understand what Popper means by Ad Hoc revisions to scientific theories and how he might be criticized for this view.
24. Understand what Popper means when he says that every 'good' scientific theory is a prohibition.
25. Understand Popper's view on the relationship between science and induction.
26. Know what Popper thinks the actual procedure of science is.

## **Carnap**

27. Know the name of the philosopher (who was on the Greek soccer team in the *Monty Python* video) whom Rudolf Carnap names in his article in connection with anticipatory theories. Also, know why this philosopher is relevant to the issue of anticipatory theories.
28. Know what Carnap takes to be the function of logical analysis and how this relates to his observable/nonobservable distinction.
29. Understand what Carnap's correspondence rules are.

30. Understand the relationship between empirical laws and theoretical laws, according to Carnap.

### **Putnam**

31. According to Putnam, why does Darwin's theory of evolution, as originally put forward, pose a problem for Carnap's observable/unobservable distinction?

32. Understand what Putnam means when he says Carnap's dichotomy is "completely broken-backed."

33. According to Putnam, Newton postulated that "red light consists of red corpuscles." Why does he think this is a problem for Carnap?

34. Understand why Putnam thinks Carnap is wrong about how justification works in science.

### **Hanson**

35. Understand what Hanson means when he writes that "[s]eeing is an experience" and that "[p]eople, not their eyes, see."

36. Understand why Hanson thinks that the explanation that "[differences] between [how people sometimes see different things when viewing the same object] must arise in the interpretations they put on these data" is inadequate.

37. Know what Hanson thinks fundamental physics is primarily a search for.

### **Stace**

38. Understand how Stace uses the concept of cause to demonstrate that unobservables don't exist (or, at least, can't be known to exist).

39. Understand how Stace's nautical almanac example is supposed to illustrate that the formulae of the atomic theory are true.

40. Stace thinks that science can predict events in the future as well as events in the past--such as an eclipse in 585 B.C.E. Understand what he means by this.

41. Understand why Stace thinks forces are a fiction.