

Questions for Exam 1

Philosophy 471

Updated September 15, 2006

The first exam will consist of a subset of the following questions.

1. Give an example of (a) a law of nature and (b) a fact that is not a law of nature.
2. Does the term “law of nature” mean a general fact? Justify your answer.
3. In philosophical discussions of laws of nature, what is meant by the term “accident”? Is a traffic accident an “accident” in this sense? Justify your answer to the latter question.
4. What is a counterfactual conditional?
5. Give an example of:
 - (a) A counterfactual conditional that is correct because a fact is a law.
 - (b) A counterfactual conditional that is incorrect because a fact is an accident.
6. “Only true laws support counterfactuals, while accidental regularities do not.” Is this correct? Justify your answer.
7. What is the range of invariance of a statement? Is an accident’s range of invariance always a subset of a law’s range of invariance? Justify your answer to the latter question.
8. Give one example of each of the following (four examples altogether).
 - (a) Showing that a fact follows from a law:
 - i. Explains the fact.
 - ii. Does not explain the fact.
 - (b) Showing that a fact follows from an accidental generalization:
 - i. Explains the fact.
 - ii. Does not explain the fact.
9. Does it ever make a difference to explanation whether a generalization is an accident? Justify your answer.
10. Suppose that a generalization is inductively confirmed if evidence that it holds in some instances raises the probability that unobserved instances also conform to the generalization. Using this definition, give one example of each of the following (three examples altogether).
 - (a) A generalization that was believed to possibly be a law and was inductively confirmed by positive instances.

- (b) A generalization that we believe would be an accident if true and that is:
- i. Inductively confirmed by positive instances.
 - ii. Not inductively confirmed by positive instances.
11. Explain what a subjunctive conditional is and give an example. How are counterfactual conditionals related to subjunctive conditionals?
 12. What does Lange mean by the notation " $p > q$ "?
 13. If p is true, what determines whether " $p > q$ " is correct, according to Lange?
 14. If p is false, does the truth value of q determine whether " $p > q$ " is correct? Justify your answer.
 15. (a) What does it mean to say that something is physically necessary? (b) Are all laws physically necessary? Justify your answer. (c) Are all physically necessary facts laws? Justify your answer.
 16. The following are three proposals about the relation between laws and counterfactuals.
 - P1. p is a law iff, for all q consistent with the laws, $q > p$ is correct.
 - P2. p is physically necessary iff, for all q consistent with the laws, $q > p$ is correct.
 - P3. If p is non-nomic, then p is physically necessary iff, for all non-nomic q consistent with the laws, $q > p$ is correct.

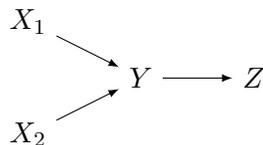
(a) Give a counterexample to P1 that is not a counterexample to P2; explain why it is a counterexample to P1. (b) Give a counterexample to P2 that is not a counterexample to P3; explain why it is a counterexample to P2.
 17. What does Lange mean by U and Λ ? State P3 using these symbols.
 18. State a criterion that Lange gives for telling whether a fact is an implicit part of the antecedent of a counterfactual.
 19. Lange describes an example in which it seems correct for a physician to say: "Had the syringe been filled with arsenic, then we would have discovered that such a large dose of arsenic is not always lethal." Is this a counterexample to P3? Why, or why not?
 20. Describe the paradox involving Darcy and Elizabeth; say what the two apparently inconsistent propositions are and why, in the context of the story, each seems to be correct.
 21. Describe Maher's resolution of the paradox involving Darcy and Elizabeth.
 22. Why does Lange say that P3 "does not explain why the laws' relation to counterfactuals is so *special*"?
 23. State what it means for a set of statements to be non-nomically stable.
 24. State Lange's argument that Λ is NNS.
 25. What is the special relation between laws and counterfactuals, according to Lange? What makes this relation special?

26. Why has it been thought that many scientific laws must contain a (usually unstated) proviso?
27. What is wrong with saying that laws contain a proviso that lists all the factors that need to be excluded in order for the law to be true? Illustrate your answer with at least one example.
28. What is wrong with saying that laws contain a proviso that says the only factor at work is the one whose influence is covered by the law? Illustrate your answer with at least one example.
29. What is wrong with saying that real laws don't need provisos to be true? Illustrate your answer with at least one example.
30. Lange believes that many laws contain a proviso that is usually unstated. (a) What is the content of these provisos, according to Lange? (b) Does the inclusion of these provisos prevent laws from being false? Why, or why not?
31. State three criticisms of Lange's solution to the problem of provisos.
32. Suppose provisos could exclude all disturbing factors; would that be enough to make laws true? Justify your answer with an example.
33. Prove that $\Lambda = U$.
34. Lange's revised definition of Λ is:

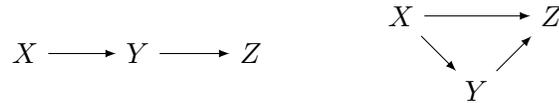
Λ' is the set of claims that correspond to inference rules (mediating inferences among claims in U) that must be reliable if the inference rules corresponding to the laws are all reliable.

State three reasons for doubting that this picks out any definite set.

35. What did Lange say is the special relation between laws and counterfactuals? Why is this not correct on his original definitions? State two reasons for doubting that it is correct on his revised definitions.
36. What does it mean for a theory of causation to be reductive? Give an example of a reductive theory of causation.
37. Is Woodward's manipulability theory of causation reductive? Explain.
38. Give an example of your own of (a) a token-causal claim, and (b) a type-causal claim.
39. Let S be the variable with values {smokes, does not smoke} and let D be the variable with values {develops lung cancer, does not develop lung cancer}. If S causes D , in Woodward's sense, does it follow that smoking raises the probability of developing lung cancer? Explain.
40. Draw the graph of the causal structure when $Y = X_1X_2 + X_3$.
41. Write equations that give the following causal structure:



42. Explain what Woodward means by:
- (a) X is a total cause of Y .
 - (b) X is a direct cause of Y with respect to variable set \mathbf{V} .
 - (c) X is a contributing cause of Y with respect to variable set \mathbf{V} .
43. Suppose it is known that X , Y , and Z are related in one of the following two ways:



Describe how to determine experimentally which is correct.

44. Are the concepts of total cause, direct cause, or contributing cause transitive? Justify your answer.
45. State Woodward's definition (AC) of actual causation.
46. Is actual causation, as defined by (AC), transitive? Justify your answer.
47. A sergeant and a major give orders to a corporal. The major's orders always trump the sergeant's, in the sense that the corporal always does what the major orders, regardless of the sergeant's orders. But when the major gives no orders, the corporal always follows the sergeant's orders. Suppose that the major and the sergeant order "Advance" and the corporal advances. According to (AC), does the major's order cause the corporal to advance? Does the sergeant's? Justify your answers.
48. Each of two campers throws a lighted cigarette into the forest, where each cigarette on its own would have produced a forest fire, and a fire follows. Was the action of either camper a cause of the fire, according to (AC)? Justify your answer.