Questions for Exam 2

Philosophy 517

Spring 2007

Exam 2 will consist of a subset of the following questions.

1. For each of the following, say whether it is implied by A1–A9, incompatible with A1–A9, or neither. Justify your answers.

   (a) $p(F_1 a_1 . F_2 a_1) > 0$.

   (b) $p(F_1 a_1 . F_2 a_2) > 0$.

   (c) $p(F_1 a_1 . F_1 a_2) > 0$.

   (d) $p(F_1 a_1 . F_2 a_2) = p(F_2 a_1 . F_1 a_2)$.

   (e) $p(F_1 a_1 . F_1 a_2) < p(F_1 a_1 . F_1 a_3)$.

   (f) $p(F_2 a_1 | F_2 a_2) = p(F_2 a_1)$.

   (g) $p(F_1 a_1 | F_2 a_2) = p(F_1 a_1 | F_3 a_3)$.

   (h) $p(F_1 a_1 | F_2 a_2 . F_3 a_3) > p(F_1 a_2 | F_4 a_4 . F_5 a_5)$.

2. State the $\lambda - \gamma$ theorem.

3. What significant quantity is γ_i equal to? What was Carnap's suggestion for fixing its value?

4. What effect does increasing or decreasing the value of λ have?

5. What value of λ does Maher favor? What is his justification?

6. Are the following criticisms of Carnap's inductive logic sound? Justify your answers.

   (a) The whole point of the theory of logical probability is to explicate ampliative inference, although given the apparent arbitrariness in the choice of language and in the setting of λ—thus, in the choice of confirmation function—one may wonder how well it achieves this.

   (b) If one's credences are to be based on logical probabilities, they must be relativized to an evidence statement, e. But which is it to be? Carnap's recommendation is that e should be one's total evidence ... However, when we go beyond toy examples, it not clear that this is well-defined.

   (c) The total evidence criterion goes hand in hand with positivism and a foundationalist epistemology according to which there are such determinate, ultimate deliverances of experience. But perhaps learning does not come in the form of such "bedrock" propositions, as Jeffrey (1992) has argued.

(d) Scientific progress often brings with it a change in scientific language ... Thus, the growth of science may overthrow any particular confirmation theory. There is something of the snake eating its own tail here, since logical probability was supposed to explicate the confirmation of scientific theories.

7. What is a Dutch book? What is the simple Dutch book argument? Is this argument sound? Why, or why not?

8. What does a representation theorem say? Describe three conditions that are often assumed in a representation theorem.

9. State the simple representation-theorem argument for the conclusion that a rational person has degrees of belief that satisfy the laws of probability.

10. What did *Betting on Theories* end up claiming about rational degrees of belief? (You can give the corrected version.)

11. State an objective alternative to the subjective theory of *Betting on Theories*. Which is better, and why?

12. James Joyce (2004 pp. 135–136) presents an argument that "it is practically irrational to hold beliefs that violate the laws of probability." Explain how you can tell, without looking at the argument, that it is unsound.

13. Mark Kaplan (1996 ch. 1) argued that if your degrees of belief are epistemically rational then they are representable by a set of probability functions. Explain how you can tell, without looking at his argument, that it is unsound.

14. State the definition of f^o. Is this a good explicatum for pp? Justify your answer.

15. State the definition of f^a. Is this a good explicatum for pp? Justify your answer.

16. State the definition of f^∞. What was von Mises' objection to this as an explicatum for pp?

17. State the definitions of a *place selection*, a *collective*, and f^m.

18. What did Jeffrey take von Mises' explicatum for pp to be? What was his objection to this? Is that a good objection to von Mises' theory? Why, or why not?

19. What was Lewis's objection to f^m as an explicatum for pp? Is it a good objection? Justify your answer.

20. Observation of finitely many outcomes of X doesn't imply anything about the existence or values of f_X^m. Why has this been thought to be an objection to f^m? Is it a good objection? Justify your answer to the latter question.

21. What is the reference class problem? Is it a serious difficulty for frequency theories of probability? Explain.

22. Is f^m a good explicatum for pp? Justify your answer.

23. What is meant by an f_X theory, an f_S theory, and the propensity interpretation of probability? How are these related to one another?

24. Did von Mises advocate what Popper calls the frequency interpretation of probability, or what he calls the propensity interpretation? Justify your answer.

25. Are there "singular" physical probabilities? Justify your answer.

26. Did Popper have a good argument against f_S theory? If not, is there a better one? Explain.

27. What is wrong with the term "interpretations of probability"?

28. What should so-called "interpretations of probability" be called, according to Hájek? What, if anything, do you think Hájek meant by that? Justify your answer. What is Maher's alternative?

29. What method does Maher propose for evaluating theories of probability? Why do you think Hájek doesn't use this method? What is Hájek's alternative? What are the drawbacks of Hájek's method?

30. Describe method MI for explicating ip for two properties. Is it a good method? Justify your answer.

31. Describe method MC for explicating ip for two properties. Is it a good method? Justify your answer.

32. Describe method MM for explicating ip for two properties.

33. Is MM open to the objection against MI that was raised in class? Justify your answer.

34. Is MM open to the objection against MC that was raised in class? Justify your answer, without proofs.

35. State Carnap's axiom of analogy. Does MM satisfy it? Should an explicatum for ip satisfy it? Justify your answer to the latter question.

36. For each of the following, say whether it satisfies the axiom of convergence and prove that your answer is correct.

    (a) MI.
    (b) MC.
    (c) MM.

37. What does it mean for $O_1, \ldots, O_n$ to be independent in pp_X?

38. Prove that if $pp_X(O_1) > 0$ then O_1 and O_2 are independent in pp_X iff $pp_X(O_2|O_1) = pp_X(O_2)$.

39. State the independence principle IN.

40. Prove that (i) and (ii) are equivalent:

    (i) For all positive integers n,
    $$pp_{X^n}(O_1^{(1)} \ldots O_n^{(n)}) = pp_X(O_1) \ldots pp_X(O_n).$$
    (ii) For all positive integers n,
    (a) $pp_{X^n}(O_i^{(i)}) = pp_X(O_i)$; and
    (b) $O_1^{(1)}, \ldots, O_n^{(n)}$ are independent in pp_{X^n}.

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41. An urn contains five white balls and five black balls. Let X = drawing two balls from the urn without replacement, O_i = the ith ball is white. Are O_1 and O_2 independent in pp_X? Is this a counterexample to IN? Justify your answers.

42. Levi argued against IN by saying:

    > [A person] *might believe that coin $\underline{a}$ is not very durable so that each toss alters the chance of heads on the next toss and that how it alters the chance is a function of the result of the previous tosses.*

    Describe three possible identifications of the experiment type in this example and, for each, say whether the example violates IN, and why.

43. Does IN imply that X must be repeatable in order for pp_X to exist? Justify your answer.

44. Levi (1990 p. 120) said: "The chance of coin a landing heads on a toss may be 0.5, but the chance of the coin landing heads on a toss by Morgenbesser may, at the same time, be 0.9." Is that correct? Justify your answer.

45. If pp_X and $pp_{X'}$ exist, does it follow that $pp_{X \vee X'}$ exists? Explain.