Questions for Exam 3

Philosophy 471

November 30, 2006

1. What is the problem of induction, according to Howson and Urbach? What facts make it seem to be a problem?

2. What is Popper's solution to the problem of induction? What is Howson and Urbach's first criticism of this solution?

3. The evidence that scientists consider as confirming a theory is often not a logical consequence of the theory. Describe three common kinds of situation in which this happens.

4. What does the term "Bayesian" usually refer to, according to Howson and Urbach? What reason do they give for this? Is their reason an adequate justification for using the term this way? Why, or why not?

5. State Bayes's theorem (not just the formula, but also the conditions under which it holds).

6. In a certain town, 85% of the cabs are green and the other 15% are blue. One night a cab is involved in a hit-and-run accident and a witness says the cab was blue. The witness was tested under conditions like those on the night of the accident and found to correctly identify blue cabs as blue 80% of the time, and likewise for green cabs. On the basis of this information, what is the probability that the cab was blue?

7. A statistics textbook says:

   > *A good test procedure is one in which both α [the probability of rejecting the hypothesis when it is true] and β [the probability of accepting it when it is false] are small, thereby giving us a good chance of making the correct decision.* (Freund and Walpole, *Mathematical Statistics*, 3rd ed. p. 364.)

   What is wrong with this? Justify your answer.

8. John Worrall wrote:

   > *It would be a miracle, a coincidence on a near-cosmic scale, if a theory made as many correct empirical predictions as, say, the general theory of relativity or the photon theory of light without what the theory says about the fundamental structure of the universe being correct or "essentially" or "basically" correct. But we shouldn't accept miracles, not at any rate if there is a non-miraculous alternative ... So it is plausible to conclude that presently accepted theories are indeed "essentially" correct.* (Quoted in Howson, *Hume's Problem*, p. 37)

   Is this correct? Explain.

9. For each of the following, say (a) what it asserts, (b) whether it is true for absolute confirmation, and (c) whether it is true—or at least plausible—for incremental confirmation. Justify your answers to (b) and (c).

   - Nicod's condition.
   - Consistency condition.
   - Consequence condition.

10. Does "confirm" in ordinary language mean either absolute or incremental confirmation? Justify your answer.

11. According to Goodman, what does "E confirms H" mean in ordinary language? Is he right? Justify your answer to the latter question.

12. Describe a situation in which the inductive probability of a die landing six is (a) the same as its physical probability; (b) different to its physical probability.

13. Is inductive probability the same thing as subjective probability? Justify your answer.

14. What does it mean for a probability concept to be logical in Carnap's sense? Is inductive probability logical in Carnap's sense? Justify your answer to the latter question.

15. Are the following arguments sound as applied to inductive probabilities? Justify your answer.

   (a) There is very little agreement on the values of probabilities in the simplest cases. But the simplest cases are the ones where logical relations should be most clear. Therefore, logical probabilities don't exist.

   (b) Logical probabilities must be determined by a general rule. But the only rule that has been proposed is the Principle of Indifference and it leads to contradictions. Therefore, logical probabilities don't exist.

16. What is Maher's argument that inductive probabilities exist?

17. Define "explication," "explicandum," and "explicatum."

18. What is Maher's justification for requiring p to satisfy the mathematical laws of probability?

19. Is the function p logical in Carnap's sense? Why, or why not?

20. How is $C(H, E, D)$ defined and what purpose is it intended to serve?

21. It is usually supposed that if H logically implies E given background evidence D, then observation of E incrementally confirms H given D. What is the corresponding statement about C? What provisos must be added to make this true?

22. Let $D =$ Lime is an alkali; $E =$ Lime turns syrup of violets green; $H =$ All alkalis turn syrup of violets green. Does E incrementally confirm H given D? Justify your answer.

23. State two conditions that C should satisfy if it is to adequately reflect reasoning by analogy. Give an intuitive justification for each condition.

24. State Nicod's condition and show that it is false for some background evidence.

25. How did Good argue that Nicod's condition is false when there is no background evidence?

26. Express in explicatum terms the claim that Nicod's condition holds when there is no background evidence; say what the symbols you use mean. What did Maher show about this?

27. Under what conditions is $C(A, Ga, Fa)$ true? Explain why.

28. State the three propositions involved in Hempel's ravens paradox and prove that they are inconsistent.

29. Express the following in explicatum terms and state two reasons why it is false: *In the absence of background evidence, the evidence that some individual is a non-black non-raven does not confirm that all ravens are black.*

30. (a) State Goodman's definition of "grue." (b) Give an example of something that is grue and something that is not grue.

31. Define two explicata for the concept of a projectable predicate. For each explicatum, say whether "green" and/or "grue" is projectable in that sense (and with respect to what, if the explicatum depends on something else).

32. Maher formulates (a particular instance of) the problem of induction in terms of (i) justification and (ii) inductive probability. State both formulations and Maher's reason for regarding these as equivalent.

33. Suppose the problem of induction is to show that $ip(S_{n+1}|S_1 \ldots S_n)$ is high, and to explain why. What is Maher's solution to this problem?

34. Hume argued that the problem of induction can't be solved with "a priori demonstrative reasoning" because "it is not a contradiction to suppose that the course of nature may change." Is this a sound argument? Explain.

35. Does a solution to the problem of induction need to show that beliefs with high inductive probability are usually true? Explain.

36. What is an experiment token? What is an experiment type? Give an example of each.

37. What is determinism? Is it possible for pp's to have values other than 0 or 1 if determinism is true? Explain.

38. Suppose $f_X(O)$ is defined as follows:

   $f_X(O) = r$ iff, in an infinite sequence of repetitions of X, O would occur randomly but m/n would approach r as a limit.

   Is $f_X(O)$ a good explicatum for $pp_X(O)$? Why, or why not?

39. What is a Q-proposition? What is the principle of direct inference? What is the principle of irrelevance?

40. State Maher's proof of the following:

   (a) $q_X(O) \geq 0$.
   (b) If O is logically necessary, $q_X(O) = 1$.

(c) If O_1 and O_2 are incompatible, $q_X(O_1 \vee O_2) = q_X(O_1) + q_X(O_2)$.

41. According to Maher's explication, how do we learn the values of physical probabilities? (A brief verbal answer is sufficient.)

42. Do you think there is a physical probability that the next U.S. president will be a Democrat? Justify your answer using Maher's account of physical probability.

43. State three possible explicata for "E favors H_1 over H_2." What is the logical relation between them?

44. State the law of likelihood and a corresponding explicatum statement. Explain briefly how one of these can be used to argue that the other is correct.

45. According to the law of likelihood, which (if either) of H_1 and H_2 is favored by E in the following cases? Justify your answers.

   (a) E = a ball drawn randomly from an urn and is black; H_1 = 10% of the balls in the urn are black, H_2 = 20% of them are black.

   (b) E = a die toss came up even; H_1 = it didn't come up 1; H_2 = it came up 2.

   (c) E = a die toss came up even; H_1 = it came up 4 or 6; H_2 = it came up 2.

46. Does the lack of a sharp distinction between species and varieties favor natural selection over independent creation as the origin of species? Justify your answer using the law of likelihood.

47. Does the existence of rudimentary organs favor natural selection over independent creation as the origin of species? Justify your answer using the law of likelihood.