Phil 12
Fall, 2012

Directions and Sample Questions for First Exam

I. Logic and the Basics of Scientific Reasoning

A. Basic concepts: Select the *best* answer to the following multiple choice questions about basic concepts of logic and scientific reasoning as used in this course (10 points)

1. Which of the following statements is true?
    a. The term *hypothesis* connotes degree of belief in a conjecture. Unlike the term *theory*, which refers to a conjecture that is widely accepted, a hypothesis is a conjecture that is generally rejected
    b. Once a hypothesis is referred to as a *law*, it becomes significantly less likely to be rejected as more evidence is gathered
    c. A hypothesis is a conjecture that is formulated prior to performing an experiment. Once an experiment has been formed, a hypothesis becomes a theory
    d. A hypothesis typically goes beyond reporting what can be observed to propose an explanation for the observations

2. Which of the following could be a counterexample to a definition of *dog*
    a. an example that shows that dogs have surprising new properties
    b. a turkey that satisfies the sufficient conditions for being a dog
    c. a cat that satisfies the necessary conditions for being a dog.
    d. a dog that does not satisfy one set of sufficient conditions for being a dog

3. Which of the following is a contradiction?
    a. I like physics, but I am not good at it.
    b. I like physics, but I do not like any sciences.
    c. I like physics, but I do not like mathematics.
    d. I like physics, but I am a philosophy major.

4. Which of the following is a tautology?
    a. Human beings are mortal.
    b. Codex is a monkey and Kwan is a StarCraft world champion.
    c. If Clara is either tall or not tall, then she both is and is not a frost mage.
    d. If Zaboo is a warlock, then Vork either is a warrior or Vork is not a warrior.

5. Which of the following is a counterexample to the definition of a box as a rigid container with a cover?
    a. a box that is not rigid
    b. a covered container that is not rigid
    c. a covered container that is not a box
    d. something rigid that is not a box

6. Which of the following is an example of a valid statement?
    a. A bachelor is an unmarried male.
    b. The longest day of the year is in June.
    c. Can you help me with this?
    d. None of the above

7. Which of the following statements is true?
   a. A valid argument cannot have false premises and a false conclusion
   b. A valid argument cannot have a false conclusion
   c. A valid argument must have true premises and a true conclusion
   d. A valid argument may have false premises and a true conclusion

8. In the statement "The dog won't bite unless you threaten" "the dog bites" is
   a. a necessary condition for you threatening
   b. neither a necessary nor a sufficient condition for you threatening
   c. a sufficient condition for you threatening
   d. both a necessary and a sufficient condition for you threatening

9. Which of the following is not a conclusion indicator?
   a. therefore
   b. since
   c. thus
   d. proves that

10. In a valid argument with a false conclusion
   a. all the premises must be true
   b. at least one premise must be false
   c. the premises may be either true or false
   d. you cannot tell anything about the truth of the premises

B. Conditionals: Select the *best* answer to the following multiple-choice questions about conditional statements. (15 points)

1. The statement "If there is a storm or the sprinklers are on, then we will get wet" is false when:
   a. There is not a storm and the sprinklers are not on, yet we get wet.
   b. The sprinklers are on and we get wet.
   c. There is not a storm and the sprinklers are not on, and we do not get wet.
   d. There is a storm and we do not get wet.

2. "Only if you follow the directions will you pass the exam" is logically equivalent to which of the following statements?
   a. If you follow the directions, then you will pass the exam
   b. You will pass the exam if you follow the directions
   c. If you pass the exam, then you followed the directions
   d. Unless you passed the exam, then you followed the directions

3. The statement "Only if you follow the directions will you pass the exam" is false when
   a. You followed the directions and passed the exam
   b. You followed the directions and did not pass the exam
   c. You did not follow the directions and passed the exam
   d. You did not follow the directions and did not pass the exam

4. Which of the following is true of the statement "Only if a miracle occurs will Joe pass the class"?
   a. The occurrence of a miracle is a sufficient condition for Joe's passing the class
   b. It is false when Joe passes the class and a miracle does occur
   c. It is logically equivalent to the statement "Unless Joe passes the class, a miracle will not occur
   d. None of the above

5. The statement “They will die unless a cure is found” is logically equivalent to which of the following
   a. If they do not die, then a cure was found
   b. If a cure is found, then they will not die
   c. If they die, then a cure was not found
   d. Only if a cure was not found will they die

C. Conditional arguments: Identify the form of each of the following conditional arguments AND whether it is valid or not. Both parts must be correct to get credit for the question (15 points)

1. If Juan knows about Mendelian inheritance, he is a biology major. Juan does not know about Mendelian inheritance. Therefore, he is not a biology major.

   a. Modus ponens b. Modus tollens
   c. Affirming the consequent d. Denying the antecedent

   e. Valid f. Invalid

2. If there is still fruit on the plate, it is poisoned. But there is no fruit on the plate. Therefore it is not poisoned.

   a. Modus ponens b. Modus tollens
   c. Affirming the consequent d. Denying the antecedent

   e. Valid f. Invalid

3. If Link did not possess the triforce then he couldn't have beaten Gannon. But clearly he did beat Gannon. Thus, it follows that Link possessed the triforce.

   a. Modus ponens b. Modus tollens
   c. Affirming the consequent d. Denying the antecedent

   e. Valid f. Invalid

4. The defendant is not guilty because she is smiling and if she were guilty she would not be smiling.

   a. Modus ponens b. Modus tollens
   c. Affirming the consequent d. Denying the antecedent

   e. Valid f. Invalid

5. There will be more traffic accidents in the future. We know this because the number of drivers is increasing, and if the number of drivers increases, there will be more traffic accidents.

   a. Modus ponens b. Modus tollens
   c. Affirming the consequent d. Denying the antecedent

   e. Valid f. Invalid

D. Logic and Evidential Relations: Answer the following questions about the logical relations involved in evaluating hypotheses. (15 points)

Consider the following hypothesis, prediction, and argument:

Hypothesis: Human beings are the product of evolution.
Prediction: The human visual system does not have a blind spot.
Argument:
If human beings are the product of evolution, then the human visual system does not have a blind spot.
The human visual system does contain a blind spot.
Therefore, Evolution is false.

For each of the following strategies, explain why it either is or is not a good strategy for challenging the argument and identify which is the best to use

Strategy #1: Challenge the validity of the argument
Strategy #2: Challenge the claim that the human visual system contains a blind spot
Strategy #3: Challenge the first premise

II. Observation

A. Observation, Categorization, and Taxonomy: Answer the following questions about observation, categorization, and taxonomy in a short paragraph. (15 points)

1. What aspect of perception is illustrated by the drawing on the left? What challenge does this pose to scientists? Explain in some detail.

2. Most native Japanese speakers who have grown up in Japan cannot distinguish between the "l" sound and the "r" sound. How might the fact that neither sound appears in Japanese explain this fact? How, nonetheless, might your roommate, a native Japanese speaker who grew up in Japan *appear* to distinguish perfectly between these letters in words you use in conversation with her?

2. Why is it important to plan carefully the coding system that will be used in an observational study? What can go wrong if one has a poorly designed coding system?

B. Basic concepts: Select the *best* answer to the following multiple-choice questions about terms used to describe features of observational research, including variables and their measurement. (10 points)

1. For classifying furniture, the categories dining table, desk chair, sofa, lamp, are
a. exhaustive and exclusive
b. exhaustive but not exclusive
c. exclusive but not exhaustive
d. neither exclusive nor exhaustive

2. Jane Goodall's decision to use binoculars in her research on chimpanzees in Gombe National Park presumably reflected her concern with:
a. reliability
b. reactivity
c. observer bias
d. artifactual results

3. When a nominal variable is expressed in terms of numbers, it uses the numbers
   a. only as names
   b. to specify rank ordering
   c. to quantify differences between items
   d. to specify ratios between items

4. The reactivity bias involves
   a. researchers becoming upset with the participants in the study
   b. participants in a study altering their behavior as a result of being observed
   c. participants in a study becoming upset with the researchers and destroying the study
   d. researchers' reports being influenced by their expectations

5. When the American Podiatrist Association evaluates its members as *highly qualified*, *qualified*, and *unqualified*, it is employing:
   a. a nominal variable
   b. an ordinal variable
   c. an interval variable
   d. a ratio variable

C. Observational research, variables, and measurement: Select the *best* answer to the following multiple-choice questions. (20 points)

1. In naturalistic observational research, which of the following should *not* occur
   a. observation is performed indoors
   b. the observer manipulates events
   c. a video record is made of the event
   d. behavior is coded into categories

2. Which of the following is not true?
   a. One is performing time sampling if one records data from every third sale at a store
   b. One is performing event sampling if one records data from every 10^{th} person to check a book out at the library
   c. One is performing time sampling if one records traffic conditions every 10 minutes
   d. One is performing situation sampling if one records events at different coffee shops

3. Which of the following is a measure of central tendency?
   a. standard deviation
   b. variance
   c. range
   d. mode

4. Which of the following is not true?
   a. In some distributions, the mode is larger than the median
   b. In some distributions, the median is larger than the arithmetic mean
   c. In some distributions, the arithmetic mean is larger than the standard deviations
   d. In some distributions, the standard deviation is larger than the variance

5. Which of the following is true of a normal distribution?
   a. The scores are equally distributed across the range
   b. There are fewer scores further from the peak
   c. The peaks are equally distributed across the range
   d. There are more scores further from the peak

6. If the distribution is normal, what percent of scores lie within 2 standard deviations of the mean?
   a. 50%
   b. 68%
   c. 95%
   d. 99%

7. In order to estimate how close the mean of the actual population is to the mean of a sample, one needs to know
   a. the median of the sample
   b. the standard deviation of the actual population
   c. the standard deviation of the sample
   d. what percentage of the population was actually sampled

The following questions are based on this scenario:

How much of their awake time do marmots spend eating? To answer this question, a researcher videotaped several hours of marmot behavior from an inconspicuous location and then arranged for students to code the marmot behavior into a number of exclusive and exhaustive categories, identifying for each moment which behavior the marmot was exhibiting.

8. The investigator in this study was
   a. a participant observer
   b. conducting an experiment
   c. engaging in structured observation
   d. engaging in naturalistic observation

9. The length of time spent eating is a
   a. nominal variable
   b. ordinal variable
   c. interval variable
   d. ratio variable

10. If in the sample observations the mean number of minutes eating per hour during the observation period was 16 minutes and the standard deviation was 4 minutes, then
   a. with 68% confidence, the mean in the sample is between 12 and 20 minutes
   b. with 68% confidence, the mean of the actual population is between 8 and 24 minutes
   b. with 95% confidence, the mean of the actual population is between 8 and 24 minutes
   c. with 95% confidence, the mean of the actual population is between 12 and 20 minutes