

## Directions and Sample Questions for Early Term Quiz

### 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 (30 points)**

1. Which of the following statements is true?
  - a. The term *hypothesis* connotes likely a conjecture is to be true. Unlike the term *theory*, which refers to a conjecture that is widely accepted, a hypothesis is a conjecture that is generally unlikely to be true
  - 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 is a conjecture about some phenomenon in the world, such as what causes it
  
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 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
  
5. 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
  
6. 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

**B. Conditionals: Select the *best* answer to the following multiple-choice questions about conditional statements. (35 points)**

1. The statement “If there is a storm, then we will get wet” is false when:
  - a. There is not a storm, yet we get wet.
  - b. There is a storm 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 (35 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 triform then he couldn't have beaten Gannon. But clearly he did beat Gannon. Thus, it follows that Link possessed the triform.

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|-----------------------------|---------------------------|
| 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.

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|-----------------------------|---------------------------|
| a. Modus ponens             | b. Modus tollens          |
| c. Affirming the consequent | d. Denying the antecedent |
| e. Valid                    | f. Invalid                |

