

### Directions and Sample Questions for First Exam

**I. 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 (20 points)**

1. The term theory refers to what?
  - a. a hypothesis that has not been tested
  - b. a systematic set of hypotheses
  - c. a hypothesis that has been thoroughly tested
  - d. a hypothesis that has not been subject to careful testing
  
2. Which of the following is not a counter example to the definition of a college as a place to study
  - a. a high school where everyone studies
  - b. a library
  - c. a private college
  - d. a college at which some people do not study
  
3. Which of the following is a contradiction?
  - a. Everything that is fun costs money.
  - b. Everyone always wants more money.
  - c. Money is required but is not needed.
  - d. Having lots of money is not always a good thing.
  
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. Either Vork is a warrior or he is not.
  
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. What can we say about a valid argument if we know that the premises are false?
  - a. It is sound
  - b. The conclusion is also false
  - c. The conclusion is true
  - d. None of the above
  
7. Which of the following statements is true?
  - a. A valid argument has true premises and a true conclusion
  - b. A valid argument cannot have a false premise
  - c. If the conclusion of a valid argument is false, so must be at least one premise
  - d. A valid argument cannot have false premises and a true conclusion

8. In the statement “The dog won’t bite unless you threaten” “the dog bites” is
- a necessary condition for you threatening
  - neither a necessary nor a sufficient condition for you threatening
  - a sufficient condition for you threatening
  - both a necessary and a sufficient condition for you threatening
9. Which of the following is not a conclusion indicator?
- therefore
  - since
  - thus
  - proves that
10. If a valid argument has a false premise
- the conclusion is false
  - the conclusion is true
  - the conclusion is true if the argument is still sound
  - you cannot tell anything about the truth of the conclusion

**B. Conditionals: Select the *best* answer to the following multiple-choice questions about conditional statements. (25 points)**

1. The statement “If I am allowed to drive then I have a license” is false when:
- I am allowed to drive and have a license.
  - I don’t have a license and am allowed to drive.
  - I don’t have a license and am not allowed to drive.
  - I am not allowed to drive but have a license.
2. “The merchandise will be on sale only if not enough has been sold” is equivalent to which of the following?
- If the merchandise is on sale, then not enough has been sold.
  - If the merchandise is on sale, then enough has been sold.
  - Unless the merchandise is on sale, enough has been sold.
  - Unless the merchandise is on sale, not enough has been sold.
3. The statement “The merchandise will be on sale only if not enough has been sold” is false when
- The merchandise is on sale and enough has been sold.
  - The merchandise is on sale and not enough has been sold.
  - The merchandise is not on sale but enough has been sold.
  - The merchandise is not on sale and not enough has been sold.
4. Which of the following is true of the statement “Only the brave will be hired”?
- Being brave is a sufficient condition for being hired
  - Being brave is a necessary condition for being hired
  - It is logically equivalent to the statement “Unless some is brave, they will be hired.”
  - It is logically equivalent to the statement “Unless someone is hired, they are not brave.”

5. The statement “Unless the Federal government shuts down, you should receive your check by Monday” is logically equivalent to which of the following

- a. If the government shuts down, you will receive your check by Monday.
- b. If the government does not shut down, you should receive you check by Monday.
- c. If the government does not shut down, you should not receive your check by Monday.
- d. Only if the govern shuts down should you receive your check by Monday.

**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 (30 points)**

1. If Juan is a physics student he learned calculus. Juan learned calculus. So, Juan is a physics student.

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

2. If it is sunny, class will be outdoors. But it is not sunny. Therefore, class will not be outdoors.

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

3. If UCSD were not in California, surfing wouldn't be a favorite activity. But it is a favorite activity. Thus, UCSD is in California.

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

4. The price of meat will not be going down because we are exporting more and if we don't export more, the price of meat would be going down.

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

5. The bus will be late. We know this because it is raining, and if it is raining, the bus will be late.

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

6. Whenever there is mist on the lake, the fish are biting. So they must be biting, since there is mist on the lake.

- |                             |                           |
|-----------------------------|---------------------------|
| 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. (30 points)**

Consider the following hypothesis and prediction for the following three questions:

*Hypothesis:* Dogs are allergic to chocolate.

*Prediction:* If I feed my dog chocolate, she will die.

1. How must the prediction be related to the hypothesis in order for it to be useful in confirming the hypothesis? What would be the structure of the full argument that would be used if the prediction turned out to be true to confirm the hypothesis? What would happen if another hypothesis makes the same prediction?
2. What relation must hold between the prediction and hypothesis in order to use the falsity of the prediction to falsify the hypothesis? *Show* the argument that would be employed to argue for the falsity of the hypothesis when the prediction turns out not to be true. Be sure to make clear how auxiliary hypotheses figure in the argument.
3. Given the argument you provided in 2, identify two plausible responses someone might put forward who continued to defend the hypothesis after the prediction turned out to be false. Be precise about how these reasons would relate to the argument you offered in 2.