

Practice Tests

A Concise Introduction to Logic

ELEVENTH EDITION

PATRICK HURLEY

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Prepared by

Patrick Hurley



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PREFACE

This booklet contains practice tests that students using *A Concise Introduction to Logic* may use in preparation for in-class tests. The tests cover Chapters 1–8, and, except for the natural deduction problems in Tests 7 and 8, they are in multiple choice format. Also, the tests tend to be quite comprehensive, so students who do well on these tests can be reasonably assured that they have a good understanding of the material in the pertinent chapter. Among the chapters covered, the only section that is missing is 1.6 (Extended Arguments), which does not lend itself to multiple choice format.

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Chapter 1 Test

(Each question is worth 2 points)

I. The following selections relate to distinguishing arguments from nonarguments and identifying conclusions. Select the best answer for each.

1. Almost all terrestrial species spend their entire lives within a narrow zone that extends from a few tens of meters above the tops of the trees to a few meters below Earth's surface. Therefore, terrestrial organisms are relatively easy to study, as they are readily accessible and visible to the scientist. In contrast, ocean life is present throughout the depth of the ocean waters, and for several meters, or more, into the sediment.

(Douglas A Segar, *Introduction to Ocean Sciences*)

- a. Argument; conclusion: They are readily accessible...scientist.
 - b. Argument; conclusion: Almost all terrestrial species...surface.
 - c. Argument; conclusion: In contrast, ocean life...the sediment.
 - d. Argument; conclusion: Terrestrial organisms are relatively easy to study.
 - e. Nonargument.
2. We can ask philosophical questions about many subjects. In aesthetics, or the philosophy of art, philosophers ask foundational questions about what kinds of things do or should count as art. In the philosophy of science, philosophers ask about such matters as whether scientific knowledge gives us a picture of reality as it is and whether progress exists in science. And philosophers of law seek to understand the nature of law itself, the source of its authority, and the basis of legal responsibility.

(Barbara MacKinnon, *Ethics: Theory and Contemporary Issues*, 6th ed.)

- a. Argument; conclusion: We can ask philosophical...subjects.
- b. Argument; conclusion: Philosophers of law...responsibility.
- c. Nonargument.
- d. Argument; conclusion: In aesthetics...count as art.
- e. Argument; conclusion: In the philosophy of science...science.

3. The structure and function of the parts of the human body are closely related. For example, the bones of the skull join tightly together to form a rigid case that protects the brain. The bones of the fingers are more loosely joined to allow a variety of movements. The walls of the air sacs in the lungs are very thin, permitting rapid movement of inhaled oxygen into the blood. The lining of the urinary bladder is much thicker to prevent the escape of urine into the pelvic cavity.

(Gerard J. Tortora *et al.*, *Principles of Anatomy and Physiology*)

- a. Argument; conclusion: The structure and function...related.
 - b. Nonargument.
 - c. Argument; conclusion: The bones of the skull...the brain.
 - d. Argument; conclusion: The lining of the urinary...pelvic cavity.
 - e. Argument; conclusion: The bones of the fingers...movements.
4. Science and technology are different. Science is a method of answering theoretical questions; technology is a method of solving practical problems. Science has to do with discovering facts and relationships between observable phenomena in nature and with establishing theories that organize and make sense of these facts and relationships. Technology has to do with tools, techniques, and procedures for putting the findings of science to use.

(Paul G. Hewitt, *Conceptual Physics*, 11th ed.)

- a. Nonargument.
 - b. Argument; conclusion: Science is a method...problems.
 - c. Argument; conclusion: Science and technology are different.
 - d. Argument; conclusion: Technology has to do...science to use.
 - e. Argument; conclusion: Science has to do...relationships.
5. Chopping onions makes you cry because when you cut into an onion you break its cells. This releases sulfenic acids, which lead to the production of a powerful gas called propanethiol sulfur oxide. When this gas reaches your eyes, it reacts with the water in your tears to produce sulfuric acid.

(Anne Marie Helmenstine, *About Chemistry*)

- a. Argument; conclusion: This releases sulfenic...sulfur oxide.
- b. Argument; conclusion: Chopping onions makes you cry.
- c. Argument; conclusion: When this gas reaches...sulfuric acid.
- d. Nonargument.
- e. Argument; conclusion: When you cut into an onion you break its cells.

6. Cobalt and nickel are constituents of many alloys. Together, they are used in alnico alloys, which also contain aluminum and iron and which are used to make powerful magnets. Cobalt is added to tungsten steels and other steels designed to be highly resistant to oxidation and corrosion. Nickel is a constituent of stainless steel and a number of other alloy steels that are both tough and ductile.

(Robert S. Boikess and Edward Edelson, *Chemical Principles*)

- a. Argument; conclusion: Nickel is a constituent...ductile.
 - b. Argument; conclusion: Cobalt and nickel... many alloys.
 - c. Argument; conclusion: Cobalt is added...corrosion.
 - d. Argument; conclusion: Together, they are used...magnets.
 - e. Nonargument.
7. Science, in the broadest sense, can be viewed as our continuing attempt to organize and describe the properties of nature. Because this is an infinitely vast subject, science is subdivided into various disciplines, such as chemistry, biology, geology, and physics. Chemistry is the branch of science that studies the properties and interactions of matter.

(John Olmsted III and Gregory M. Williams, *Chemistry: The Molecular Science*, 2nd ed.)

- a. Argument; conclusion: This is an infinitely vast subject.
 - b. Argument; conclusion: Chemistry is the branch...of matter.
 - c. Nonargument.
 - d. Argument; conclusion: Science is subdivided...and physics.
 - e. Argument; conclusion: Science, in the broadest sense...nature.
8. Conservative democrats favor a capitalistic economic system. Although human equality is not a basic principle of this school, its adherents believe that people should be given an equal opportunity to succeed (or fail) in the economic system. Capitalism makes this possible, they argue, because it is based on competition among individuals, rewarding those who function best in the system.

(Leon P. Baradat, *Political Ideologies*, 2nd ed.)

- a. Argument; conclusion: Although human equality...system.
- b. Argument; conclusion: Capitalism makes this possible.
- c. Argument; conclusion: It is based on competition...the system.
- d. Argument; conclusion: Conservative democrats favor...system.
- e. Nonargument.

9. Since happiness is pleasure and pleasure results from the satisfaction of desire, and since consumers buy goods to satisfy desires, it follows that capitalists trying to make a profit are at the same time actually working to make the consumers happy.

(Robert P Wolff, *About Philosophy*, 7th ed.)

- a. Argument; conclusion: Pleasure results from...of desire.
 - b. Argument; conclusion: Capitalists trying to make...happy.
 - c. Argument; conclusion: Happiness is pleasure.
 - d. Argument; conclusion: Consumers buy goods to satisfy desires.
 - e. Nonargument.
10. Most living organisms are single cells. Others, such as ourselves, are vast multicellular cities in which groups of cells perform specialized functions and are linked by intricate systems of communication. But in all cases, the whole organism has been generated by cell divisions from a single cell. The single cell, therefore, is the vehicle for the hereditary information that defines the species.

(Bruce Alberts and Alexander Johnson, *Molecular Biology of the Cell*)

- a. Argument; conclusion: The single cell...defines the species.
 - b. Argument; conclusion: But in all cases...from a single cell.
 - c. Argument; conclusion: Others...systems of communication.
 - d. Argument; conclusion: Most living organisms are single cells.
 - e. Nonargument.
11. Traditionally patients have been viewed as ignorant about medical matters, fearful about being sick, and childlike by virtue of their illness. They are ill-equipped to sort out what is in their best medical interest and prone to make decisions detrimental to their welfare. Thus physicians have asserted that it makes little sense to consult patients on treatment options; far better to interact with them as beloved children and decide for them.

(Jay Katz, "Informed Consent in the Therapeutic Relationship: Law and Ethics")

- a. Argument; conclusion: Traditionally patients...their illness.
- b. Argument; conclusion: Physicians have asserted...options.
- c. Argument; conclusion: They are ill-equipped...to their welfare.
- d. Argument; conclusion: Far better to interact...decide for them.
- e. Nonargument.

12. Antimaterialists tend to deride the importance of “things.” Yet, things are highly significant, not merely because of their functional utility but also because of their psychological impact. We develop relationships with things. Things affect our sense of continuity or discontinuity. They play a role in the structure of situations, and the foreshortening of our relationships with things accelerates the pace of life.

(Alvin Toffler, *Future Shock*)

- a. Nonargument.
 - b. Argument; conclusion: We develop relationships with things.
 - c. Argument; conclusion: Antimaterialists tend to... “things.”
 - d. Argument; conclusion: Yet things are highly significant.
 - e. Argument; conclusion: They play a role...the pace of life.
13. The common law came to America with the first English settlers. It was applied by courts during the colonial period and continued to be applied after the Revolution and the adoption of the Constitution. It still governs many cases today. For example, the rules of tort, contract, and agency are mainly common law rules.

(Jane P. Mallon, *et al*, *Business Law*, 12th ed.)

- a. Argument; conclusion: It was applied...the Constitution.
 - b. Nonargument.
 - c. Argument; conclusion: The rules of tort...common law rules.
 - d. Argument; conclusion: It still governs many cases today.
 - e. Argument; conclusion: The common law...first English settlers.
14. Satellite observations have truly revolutionized marine sciences. From a satellite, the entire surface of the world’s oceans can be surveyed in just a few days. Additionally, large areas of the oceans can be surveyed every few days or even hours. Before satellites, such temporal changes could be observed only at fixed locations or within small regions.

(Douglas A Segar, *Introduction to Ocean Sciences*)

- a. Argument; conclusion: Satellite observations ... marine sciences.
- b. Argument; conclusion: Large areas of the oceans ... even hours.
- c. Argument; conclusion: From a satellite ... in just a few days.
- d. Argument; conclusion: Before satellites ... within small regions.
- e. Nonargument.

15. If doctors are right that lifestyle is largely responsible for the increased incidence of diabetes, osteoporosis, heart disease, and strokes, then a mere change in lifestyle would reduce the incidence of these diseases, it would bring the cost of healthcare under control, and universal healthcare would not bankrupt the federal treasury as it currently threatens to do.
- a. Argument; conclusion: A mere change...these diseases.
 - b. Argument; conclusion: Doctors are right...and strokes.
 - c. Nonargument.
 - d. Argument; conclusion: Universal healthcare ... threatens to do.
 - e. Argument; conclusion: It would bring ... under control.
16. Erik Erikson wrote that human life as the individual experiences it is produced by the interaction and modification of three major systems: the biological system, the psychological system, and the social system. Each system can be examined for patterns of continuity and change over the life course. Each system can be modified by self-guided choices. The integration of the biological, psychological, and social systems leads to a complex, dynamic portrait of human thought and behavior.
- (Barbara M. Newman *et al.*, *Development Through Life*)
- a. Argument; conclusion: Erik Erikson ... and the social system.
 - b. Argument; conclusion: Each system ... self-guided choices.
 - c. Argument; conclusion: The integration ... thought and behavior.
 - d. Argument; conclusion: Each system ... over the life course.
 - e. Nonargument.
17. Atoms are the fundamental building blocks of chemistry. Tiny as they are, atoms nonetheless have internal structures. Furthermore, the internal structure of atoms of a particular chemical element differs from that of atoms of every other element. These differences in structure are what make the chemistry of one element different from that of another. Thus the rich diversity of chemical behavior can be traced to the internal structure of atoms.
- (John Olmsted, *et al.*, *Chemistry: The Molecular Science*, 2nd ed.)
- a. Argument; conclusion: Tiny as they are ... internal structures.
 - b. Argument; conclusion: These differences ... that of another.
 - c. Nonargument.
 - d. Argument; conclusion: The rich diversity ... structure of atoms.
 - e. Argument; conclusion: Atoms are the ... blocks of chemistry.

II. The following selections relate to identifying and evaluating deductive and inductive arguments. Select the best answer for each.

18. The headline of today's *National Times* reported the eruption of a volcano in Indonesia. Since the *Times* is a highly respected newspaper, we may conclude that a volcano did indeed erupt in Indonesia.
- a. Deductive, invalid.
 - b. Deductive, valid.
 - c. Deductive, cogent.
 - d. Inductive, strong.
 - e. Inductive, weak.
19. Figures A and B are both squares and the side of A is exactly twice as long as the side of B. Therefore, the area of A is exactly twice that of B.
- a. Inductive, weak.
 - b. Inductive, strong.
 - c. Deductive, invalid.
 - d. Deductive, valid.
 - e. Inductive, sound.
20. Linda Evans, who was an eye witness to the accident, said that the driver of the Honda ran a red light when he struck the Ford. Since Linda has a reputation for telling the truth and has nothing to gain by lying, we may conclude that the driver of the Honda did indeed run a red light when he struck the Ford.
- a. Inductive, strong.
 - b. Deductive, valid.
 - c. Deductive, invalid.
 - d. Deductive, sound.
 - e. Inductive, weak.
21. Without anyone touching it, the large picture hanging on the living room wall fell to the floor and broke. This happening proves that evil spirits do indeed exist.
- a. Deductive, invalid.
 - b. Inductive, weak.
 - c. Deductive, unsound.
 - d. Deductive, valid.
 - e. Inductive, strong.

22. More girls than boys entered their pets in the children's pet show. Since every girl entered only a cat and every boy entered only a dog, it follows that there were more cats than dogs in the show.
- Inductive, weak.
 - Inductive, strong.
 - Deductive, invalid.
 - Inductive, sound.
 - Deductive, valid.
23. The loin of swordfish at the exclusive Star of the Sea restaurant was positively wonderful last night. Therefore, it's a good bet that the same item, which appears on tonight's menu, is positively wonderful.
- Inductive, weak.
 - Deductive, valid.
 - Inductive, strong.
 - Deductive, invalid.
 - Deductive, sound.
24. The water in container *A* is 50°F and the water in container *B* is 50°F. Therefore, since $50 + 50 = 100$, if the water in these containers were mixed together, the temperature of the mix would be 100°F.
- Inductive, weak.
 - Deductive, invalid.
 - Deductive, valid.
 - Deductive, cogent.
 - Inductive, strong.
25. Fred is liked by literally everyone in his art class. Therefore, since Fred is in the class, it follows that Fred likes himself.
- Deductive, valid.
 - Deductive, invalid.
 - Inductive, strong.
 - Inductive, uncogent.
 - Inductive, weak.

26. Professor Smith has two students from Belgium who did extremely well in her calculus class. It must be the case that all students from Belgium are good at math.
- Deductive, valid.
 - Inductive, strong.
 - Deductive, invalid.
 - Deductive, unsound.
 - Inductive, weak.
27. Some artichokes are pineapples and all pineapples are vegetables. Therefore, some artichokes are vegetables.
- Inductive, strong.
 - Deductive, invalid.
 - Deductive, valid.
 - Inductive, sound.
 - Inductive, weak.
28. Kathy has the same blood type and hair color as Martina. Furthermore, Kathy has a sparkling personality. It must be the case that Martina also has a sparkling personality.
- Deductive, unsound.
 - Deductive, invalid.
 - Inductive, weak.
 - Inductive, strong.
 - Deductive, valid.
29. Since this cereal box is twice as high as that one, it follows with certainty that this box holds twice as much as that one.
- Deductive, sound.
 - Deductive, valid.
 - Inductive, weak.
 - Deductive, invalid.
 - Inductive, strong.

30. When Tom drove his car out of the driveway this morning, there were oil stains on the pavement. These stains were not there when he drove the car in the night before. We conclude that Tom's car is leaking oil.
- Inductive, strong.
 - Deductive, invalid.
 - Deductive, valid.
 - Inductive, cogent.
 - Inductive, weak.
31. The last two businesses that Hank Foster started went bankrupt. Now he's starting a third business. Surely this one will succeed. After all, you know the saying "the third time's the charm."
- Deductive, valid.
 - Inductive, weak.
 - Deductive, invalid.
 - Inductive, strong.
 - Deductive, unsound.
32. Since a is greater than b , and c is greater than d , it follows that $a + c$ is greater than $b + d$ ($a, b, c, d =$ real numbers).
- Inductive, strong.
 - Deductive, sound.
 - Inductive, weak.
 - Deductive, invalid.
 - Deductive, valid.
33. The 1500-pound dinosaur known as Utahraptor must have been a ferocious killing machine. Each of its feet had a foot-long sickle-shaped claw, and each of its powerful arms terminated in three ten-inch claws. The Utahraptor could grasp its prey with its arms while delivering fatal kicks with its feet.
- Deductive, sound.
 - Inductive, strong.
 - Inductive, weak.
 - Deductive, valid.
 - Deductive, cogent.

34. Either Albany is the capital of New York or it is the capital of Pennsylvania. But Albany is not the capital of New York. Therefore, Albany is the capital of Pennsylvania.
- Inductive, weak.
 - Inductive, strong.
 - Deductive, valid.
 - Deductive, sound.
 - Deductive, cogent.

III. The following selections relate to the counterexample method.

35. No bank tellers are investigators since all auditors are investigators and no auditors are bank tellers.

This argument is correctly symbolized as follows:

a.	b.	c.	d.	e.
No B are I.	All A are I.	All A are I.	No A are B.	No B are I.
<u>No A are B.</u>	<u>No B are I.</u>	<u>No A are B.</u>	<u>No B are I.</u>	<u>All A are I.</u>
All A are I.	No A are B.	No B are I.	All A are I.	No A are B.

36. Which of the following substitutions proves the argument invalid?

- A = fish; B = animals; I = dogs.
- A = animals; B = fish; I = dogs.
- A = animals; B = dogs; I = fish.
- A = dogs; B = animals; I = fish.
- A = dogs; B = fish; I = animals.

37. If the show is good, then the director will be pleased. Thus, if the show is good, then the audience will applaud, because if the audience applauds, then the director will be pleased.

a.	b.	c.	d.	e.
If S, then D.	If S, than A.	If S, then D.	If S, then A.	A are D.
<u>If A, then D.</u>	<u>If S, then D.</u>	<u>If S, then A.</u>	<u>If A, then D.</u>	<u>S are D.</u>
If S, then A.	If A, then D.	If A, then D.	If S, then D.	S are A.

38. Which of the following substitutions proves the argument invalid?

- a. S = Al Pacino is a woman; D = Al Pacino is a man; A = Al Pacino is a human.
- b. S = Al Pacino is a man; D = Al Pacino is a human; A = Al Pacino is a woman.
- c. S = Al Pacino is a human; D = Al Pacino is a woman; A = Al Pacino is a man.
- d. S = Madonna is a woman; D = Madonna is a man; A = Madonna is a human.
- e. S = women; D = men; A = humans.

39. All movie stars are celebrities, since all movie stars who are teen idols are celebrities.

- | | | |
|---|---|---|
| a. | b. | c. |
| $\frac{\text{If M, then T.}}{\text{If M, then C.}}$ | $\frac{\text{All M are C.}}{\text{All M who are T are C.}}$ | $\frac{\text{All M are T.}}{\text{All M are C.}}$ |
| d. | e. | |
| $\frac{\text{All M who are T are C.}}{\text{All M are C.}}$ | $\frac{\text{All M are C.}}{\text{All M are T.}}$ | |

40. Which of the following substitutions proves the argument invalid?

- a. M = men; T = fathers; C = women.
- b. M = women; T = mothers; C = men.
- c. M = humans; T = fathers; C = men.
- d. M = fathers are men; T = fathers are women; C = mothers are women.
- e. M = humans; T = women; C = fathers.

IV. Select the correct answer for the following multiple choice questions.

41. Which of the following words is *not* a premise indicator?

- a. Because.
- b. Since.
- c. As.
- d. For.
- e. Hence.

42. Which of the following sentences is *not* a statement?
- Your cat is on the roof.
 - Let's make some chow mein for dinner.
 - The *Economist* is a great magazine.
 - The national crime rate decreased last year.
 - Deficit spending will have to be curtailed.
43. In a conditional statement, the component statement immediately following the word "if" is called the:
- Antecedent.
 - Consequent.
 - Explanans.
 - Explanandum.
 - Corresponding conditional.
44. The word "because" often occurs in:
- Commands.
 - Illustrations.
 - Exhortations.
 - Explanations.
 - Conditional statements.
45. Which of the following statements is *false*?
- A conditional statement may serve as a premise.
 - A conditional statement may serve as a conclusion.
 - A single conditional statement can be an argument.
 - Conditional statements express necessary and sufficient conditions.
 - A conditional statement may express an inference.
46. An inductive argument always proceeds from:
- The particular to the particular.
 - The particular to the general.
 - The general to the particular.
 - The general to the general.
 - The presumably known to the presumably unknown.

47. Which of the following is a sufficient condition for winning a bicycle race?
- a. Having a bicycle that is more aerodynamic than any of the others.
 - b. Avoiding a flat tire.
 - c. Getting off the starting line ahead of the other racers.
 - d. Staying alive during the race.
 - e. Crossing the finish line one minute before the other racers.
48. If an inductive argument has a false premise, then we know it is:
- a. Weak.
 - b. Uncogent.
 - c. Invalid.
 - d. Unsound.
 - e. Strong.
49. If a deductive argument has true premises and a false conclusion, then we know it is:
- a. Uncogent.
 - b. Strong.
 - c. Valid.
 - d. Invalid.
 - e. Weak.
50. If a deductive argument has true premises and a true conclusion, then we know:
- a. Nothing, as such, about its validity.
 - b. It is sound.
 - c. It is cogent.
 - d. It is strong.
 - e. It is valid.

Chapter 2 Test

(Each question is worth 2½ points)

Select the best answer in the following multiple choice questions.

1. The statement “I think licorice ice cream is yucky” has primarily:
 - a. Vague meaning.
 - b. Cognitive meaning.
 - c. Emotive meaning.
 - d. Ambiguous meaning.
 - e. Extensional meaning.
2. The statement “Wellington defeated Napoleon at Waterloo” has primarily:
 - a. Cognitive meaning.
 - b. Emotive meaning.
 - c. Vague meaning.
 - d. Extensional meaning.
 - e. Ambiguous meaning.
3. Which of the following statements makes a value claim?
 - a. Microsoft Corporation is worth more than Intel.
 - b. New York is south of Boston.
 - c. Gasoline contains hydrogen.
 - d. Euthanasia is morally wrong.
 - e. Hitchcock’s *Psycho* is a frightening movie.
4. Which of the following groups of words all tend to be vague?
 - a. Normal, unique, transparent.
 - b. Excessive, professor, newspaper.
 - c. Unique, fresh, final.
 - d. Newspaper, book, bank.
 - e. Excessive, fresh, normal.
5. Which of the following groups of words all tend to be ambiguous?
 - a. Professor, gazelle, tobacco.
 - b. Mad, bank, race.
 - c. Excessive, fresh, unique.
 - d. Race, unique, tobacco.
 - e. Excessive, fresh, final.

6. Emotive terminology is often used to make:
- Theoretical claims.
 - Ambiguous claims.
 - Factual claims.
 - Value claims.
 - Intensional claims.
7. The following dispute:
- Jim: In 1960, President Kennedy received 52% of the popular vote.
- Jane: You're wrong. Kennedy received less than 51% of the popular vote.
- is best described as:
- Factual.
 - Emotional.
 - Theoretical.
 - Verbal.
 - Ambiguous.
8. Which of the following words or groups of words is not a term?
- Thomas Jefferson.
 - Best student in the class.
 - Frequently.
 - Consistency.
 - He who hesitates.
9. Which of the following are all connoted by the term "scientist"?
- Einstein, Newton, Galileo.
 - Laboratory, experiment, theory.
 - Atom, electron, molecule.
 - Einstein, intelligent, theory.
 - Analytical, intelligent, systematic.
10. Which of the following are all denoted by the term "scientist"?
- Laboratory, experiment, theory.
 - Einstein, Newton, Galileo.
 - Analytical, intelligent, systematic.
 - Atom, electron, molecule.
 - Einstein, intelligent, theory.

11. Which of the following groups of terms is in the order of increasing intension?
 - a. Daisy, flower, plant, living thing.
 - b. Flower, plant, living thing, daisy.
 - c. Living thing, plant, flower, daisy.
 - d. Living thing, daisy, plant, flower.
 - e. Plant, flower, daisy, living thing.

12. Which of the following groups of terms is in the order of increasing extension?
 - a. Fish, ocean fish, tuna, albacore.
 - b. Albacore, tuna, ocean fish, fish.
 - c. Ocean fish, tuna, fish, albacore.
 - d. Tuna, fish, albacore, ocean fish.
 - e. Fish, tuna, ocean fish, albacore.

13. Which of the following terms has empty extension?
 - a. King of the United States.
 - b. Tallest mountain on Mars.
 - c. Technicality.
 - d. Intelligence.
 - e. Space.

14. Intension means roughly the same thing as:
 - a. Purpose.
 - b. Denotation.
 - c. Extension.
 - d. Meaning.
 - e. Connotation.

15. Which of the following pairs of terms have the same extension?
 - a. Horse, dog.
 - b. Unicorn, elephant.
 - c. George Washington, Abraham Lincoln.
 - d. Werewolf, square circle.
 - e. Table, chair.

16. “Definiendum” means:
- A word that has empty extension.
 - The group of words that does the defining.
 - The same thing as “explanandum.”
 - The word that is supposed to be defined.
 - The meaning conveyed by a lexical definition.
17. “Definiens” means:
- The same thing as “explanans.”
 - The word that is supposed to be defined.
 - The group of words that does the defining.
 - The same thing as “genus.”
 - A word that has no intensional meaning.
18. The definition “ ‘Integration’ means a communist-inspired policy that forces white parents to send their children to inferior schools” is an example of a:
- Lexical definition.
 - Persuasive definition.
 - Precising definition.
 - Theoretical definition.
 - Stipulative definition.
19. The definition “ ‘Rare,’ in connection with roast beef, means cooked to a temperature of 140°F” is an example of a:
- Precising definition.
 - Stipulative definition.
 - Lexical definition.
 - Persuasive definition.
 - Theoretical definition.
20. The definition “ ‘Elephino’ means the offspring of a male elephant and a female rhinoceros” is an example of a:
- Lexical definition.
 - Theoretical definition.
 - Persuasive definition.
 - Precising definition.
 - Stipulative definition.

21. The definition “ ‘Bronchitis’ means an inflammation of the bronchial tubes” is an example of a:
 - a. Persuasive definition.
 - b. Theoretical definition.
 - c. Stipulative definition.
 - d. Precising definition.
 - e. Lexical definition.
22. The definition “ ‘Light’ means a form of electromagnetic radiation having a wavelength of 4000 to 7000 Angstroms” is an example of a:
 - a. Persuasive definition.
 - b. Stipulative definition.
 - c. Synonymous definition.
 - d. Theoretical definition.
 - e. Enumerative definition.
23. In the definition “ ‘Brawl’ means quarrel,” the term “Brawl” is the:
 - a. Genus.
 - b. Difference.
 - c. Definiendum.
 - d. Species.
 - e. Definiens.
24. The definition “ ‘consequent’ is derived from the Latin word *consequi*, which means ‘to follow’ ” is an example of:
 - a. An etymological definition.
 - b. A precising definition.
 - c. A lexical definition.
 - d. A theoretical definition.
 - e. A stipulative definition.
25. In the definition “ ‘Icon’ means a sacred image,” the word “sacred” is the:
 - a. Definiendum.
 - b. Difference.
 - c. Genus.
 - d. Explanandum.
 - e. Species.

26. The definition “‘Galaxy’ means a system of stars” is an example of:
- An extensional definition.
 - A synonymous definition.
 - An enumerative definition.
 - A definition by genus and difference.
 - An operational definition.
27. The definition “‘Singer’ means someone such as Britney Spears, Janet Jackson, and Bruce Springsteen” is an example of:
- A synonymous definition.
 - A demonstrative (ostensive) definition.
 - A definition by subclass.
 - A definition by genus and difference.
 - An enumerative definition.
28. The definition “‘Chamber’ means room” is an example of:
- An extensional definition.
 - A synonymous definition.
 - An operational definition.
 - A definition by genus and difference.
 - An enumerative definition.
29. The definition “‘Fruit’ means a peach, pear, apple, and so on” is an example of:
- A definition by subclass.
 - A demonstrative (ostensive) definition.
 - An enumerative definition.
 - An operational definition.
 - A definition by genus and difference.
30. In the definition “‘Cistern’ means a large vessel for storing water,” the term “Cistern” is the:
- Definiens.
 - Genus.
 - Difference.
 - Species.
 - Intension.

31. In the definition “‘Giraffe’ means a mammal having a very long neck,” the word “mammal” is the:
- Species.
 - Antecedent.
 - Genus.
 - Difference.
 - Definiendum.
32. Eliminating the ambiguity of a word is one of the purposes of a:
- Lexical definition.
 - Precising definition.
 - Theoretical definition.
 - Stipulative definition.
 - Persuasive definition.
33. The kind of definition that assigns a meaning to a term by indicating the members of the class that the term denotes is:
- An intensional definition.
 - An operational definition.
 - A definition by genus and difference.
 - A theoretical definition.
 - An extensional definition.
34. The definition “A substance is ‘radioactive’ if and only if a Geiger counter shows a reading when the probe is placed near the substance” is an example of:
- A synonymous definition.
 - An operational definition.
 - An enumerative definition.
 - A synonymous definition.
 - A demonstrative (ostensive) definition.
35. The definition “‘Automobile’ means that and that and that” (as you point to a number of automobiles) is an example of:
- An enumerative definition.
 - A definition by subclass.
 - A demonstrative (ostensive) definition.
 - A definition by genus and difference.
 - An operational definition.

36. Sidney Lanier's definition "Music is love in search of a word" is primarily:
- Figurative.
 - Obscure.
 - Ambiguous.
 - Circular.
 - Too narrow.
37. Will Rogers' definition "A professional athlete is someone who earned all he could in college as an amateur" is primarily:
- Obscure.
 - Negative.
 - Affective.
 - Ambiguous.
 - Vague.
38. The definition "A moose is a large animal with horns" is primarily:
- Figurative.
 - Too narrow.
 - Too broad.
 - Ambiguous.
 - Circular.
39. The definition "'Efficient' means the condition of not being inefficient" is primarily:
- Too narrow.
 - Too broad.
 - Ambiguous.
 - Negative.
 - Obscure.
40. The definition "A plumber's helper is a helper used by a plumber" is primarily:
- Figurative.
 - Negative.
 - Too narrow.
 - Ambiguous.
 - Circular.

Chapter 3 Test

(Each question is worth 2½ points)

Select the best answer for the following arguments.

1. Immediate steps should be taken to reduce this country's dependence on nuclear power. The question was put to six prominent movie stars recently, and all six agreed that nuclear power was extremely dangerous.
 - a. Appeal to the people.
 - b. Hasty generalization.
 - c. False cause.
 - d. Appeal to unqualified authority.
 - e. No fallacy.
2. Ginger, I read the paper you plan to submit for English Comp, and I noticed a few paragraphs that didn't appear to be written by you. Tell me, how long have you been plagiarizing your term papers?
 - a. Complex question.
 - b. Straw man.
 - c. No fallacy.
 - d. Appeal to pity.
 - e. Begging the question.
3. It's perfectly legal to hire a grown adult to perform menial work in a factory. But a ten-year-old kid is no less a human than an adult. Therefore, it's legal to hire a ten-year-old kid to perform menial work in a factory.
 - a. Suppressed evidence.
 - b. Weak analogy.
 - c. False cause.
 - d. Hasty generalization
 - e. Composition.
4. Advertisements claim that the new Pride detergent gets your clothes whiter and brighter than any other brand. Since no one has disproved this claim, we must conclude that it is true.
 - a. Appeal to unqualified authority.
 - b. Accident.
 - c. Amphiboly.
 - d. Division.
 - e. Appeal to ignorance.

5. Both wolves and hyenas are cunning and dangerous. Therefore, wolves are cunning.
 - a. Composition.
 - b. Begging the question.
 - c. No fallacy.
 - d. Equivocation.
 - e. Division.
6. Paul told me that he loves his children more than his wife. It must be the case that his wife doesn't like the kids.
 - a. Appeal to unqualified authority.
 - b. Amphiboly.
 - c. False dichotomy.
 - d. Argument against the person, circumstantial.
 - e. *Tu quoque*.
7. Strenuous exercise is good for people. Therefore, it would be a good idea for old Mrs. Bevans, who just had a heart attack, to go jogging today.
 - a. Accident.
 - b. Weak analogy.
 - c. Suppressed evidence.
 - d. Missing the point.
 - e. Begging the question.
8. The decision as to what courses should be required of all university students should be left to the faculty senate. If students are given a voice in this matter, it won't be long before the students dictate who should be hired and fired. In no time they'll take over the administrative functions as well, and the university will collapse.
 - a. Hasty generalization.
 - b. False cause.
 - c. Equivocation.
 - d. Slippery slope.
 - e. *Tu quoque*.

9. Senator Collins supports the proposal for the new B-2 bomber. But his arguments in favor of this project should be discounted, since the primary bidder on the B-2 bomber comes from the state he represents.
- No fallacy.
 - Argument against the person, circumstantial.
 - Suppressed evidence.
 - Red herring.
 - Argument against the person, abusive.
10. Every ingredient in this pastry is fattening. Therefore, this pastry is fattening.
- False cause.
 - Composition.
 - No fallacy.
 - Hasty generalization.
 - Division.
11. As a spokesman for the IRS, I would urge that you stop informing taxpayers of these loopholes we have been discussing. I am confident you will be happy to comply, since surely you want to avoid an audit of your last year's return.
- Accident.
 - Missing the point.
 - Appeal to ignorance.
 - Appeal to pity.
 - Appeal to force.
12. Surely God does not exist. Just look at all the suffering in the world.
- Accident.
 - Argument against the person, circumstantial.
 - Missing the point.
 - False dichotomy.
 - Appeal to pity.

13. Either the United States continues to serve as the world's police force or local squabbles will result in global chaos. Of course, we cannot tolerate global chaos. Therefore, the United States must continue to serve as the world's police force.
- False dichotomy.
 - False cause.
 - No fallacy.
 - Amphiboly.
 - Tu quoque*.
14. A recent study has shown that among the youth of our city, 80 percent of those who contracted venereal disease last year had taken sex education classes in high school. Obviously if we want to cut down on the incidence of VD, we must get rid of those sex education classes.
- Red herring.
 - No fallacy.
 - False dichotomy.
 - Missing the point.
 - Argument against the person, abusive.
15. Economist Milton Friedman argues that corporations should not have to pay income taxes. But this argument is worthless. Corporations in America are getting away with murder as it is. Consider the utilities. Those companies are supposed to be regulated by state commissioners, but the commissioners never do their job. They give the utilities whatever they want. If the members of the Public Utilities Commission were elected by the people, we wouldn't have such astronomical rates.
- Appeal to force.
 - Red herring.
 - Complex question.
 - Tu quoque*.
 - Straw man.

16. It would not be a good idea to appoint Frances McGill to the office of city manager. During the past fifteen years, McGill has managed five different businesses, and all of them declared bankruptcy as a direct result of her inept leadership.
- a. Argument against the person, abusive.
 - b. False cause.
 - c. No fallacy.
 - d. Hasty generalization.
 - e. Argument against the person, circumstantial.
17. Every tiny detail of Robert's painting is beautiful. Therefore, Robert's painting is beautiful.
- a. Division.
 - b. Appeal to unqualified authority.
 - c. No fallacy.
 - d. Composition.
 - e. Appeal to force.
18. Actors are persons and Jennifer is a great actor. Thus, she must be a great person.
- a. Equivocation.
 - b. Red herring.
 - c. Accident.
 - d. Amphiboly.
 - e. False dichotomy.
19. Either Cadillacs or Hondas are made in Japan. But Cadillacs are not made in Japan. Therefore, Hondas are made in Japan.
- a. Appeal to the people.
 - b. False dichotomy.
 - c. False cause.
 - d. Equivocation.
 - e. No fallacy.

20. Mr. Referee, surely our team was not offside on that last play. Our team has already had ten penalties this quarter, we're trailing by three touchdowns, and several of our parents traveled hundreds of miles to see this game.
- Appeal to pity.
 - Straw man.
 - Missing the point.
 - Appeal to force.
 - Slippery slope.
21. You argue that I should cut down on my drinking. But you drink much more heavily than I. You haven't been sober in a year.
- Argument against the person, abusive.
 - No fallacy.
 - Tu quoque*.
 - Appeal to force.
 - Appeal to pity.
22. You've got to get rid of those narrow neckties you wear. Narrow ties are completely out of fashion now, and no one with any class is wearing them.
- Suppressed evidence.
 - Appeal to the people.
 - No fallacy.
 - Appeal to force.
 - Argument against the person, circumstantial.
23. Professor Howard Brastoff, the famous astrophysicist, has stated that the so-called Jupiter Effect, the alignment of the nine planets in the solar system, poses no danger for the inhabitants of the Earth. Furthermore, no scientists disagree with Brastoff. Accordingly we may conclude that the Jupiter Effect is indeed harmless.
- Argument against the person, circumstantial.
 - Appeal to unqualified authority.
 - Missing the point.
 - No fallacy.
 - Accident.

24. George and Tom are both neurotic and both are seeing psychiatrists. Furthermore, both are bachelors. It must be the case that most bachelors these days are neurotic.
- Weak analogy.
 - Complex question.
 - Hasty generalization.
 - Begging the question.
 - Appeal to pity.
25. Ms. Belford thinks that Robert Crenshaw is one of the finest pianists in the country. But no one with an ounce of sense should take Belford's arguments seriously. That woman has no musical taste whatever, and some of her recent reviews in the local paper have been utterly ridiculous.
- Weak analogy.
 - Argument against the person, circumstantial.
 - Appeal to unqualified authority.
 - Division.
 - Argument against the person, abusive.
26. Participants in the recent charity benefit contributed \$10,000 to the needy of Baskerville. Howard Porter was a participant in the benefit. Therefore, Howard Porter contributed \$10,000.
- Division.
 - Appeal to ignorance.
 - Accident.
 - Equivocation.
 - Composition.
27. Charlie's computer has crashed twice in the past month, even though it's practically new. Therefore, Charlie should open the window and throw the computer out onto the street.
- Division.
 - Argument against the person, abusive.
 - Appeal to force.
 - Accident.
 - Missing the point.

28. Smith testified under oath that he saw Faubus shoot Gomez with a .22 caliber pistol at close range. Since Smith has a reputation for always telling the truth and has no personal interest in the case, we may conclude that Faubus really did shoot Gomez as Smith testified.
- a. Appeal to unqualified authority.
 - b. No fallacy.
 - c. Suppressed evidence.
 - d. *Tu quoque*.
 - e. Appeal to pity.
29. During most of the past 100 years, watch repairmen have earned a good living. Therefore, watch repairmen should earn a good living during the next 100 years.
- a. Straw man.
 - b. Division.
 - c. Suppressed evidence.
 - d. Hasty generalization.
 - e. Appeal to ignorance.
30. The use of contraceptives is immoral because anything that violates nature is immoral.
- a. Equivocation.
 - b. Hasty generalization.
 - c. Composition.
 - d. Begging the question.
 - e. Accident.
31. After John returned from work the other day, he switched on his air conditioner, and a few seconds later a power failure struck the city. Therefore, to prevent further power failures, John should keep his air conditioner shut off.
- a. False cause.
 - b. Appeal to unqualified authority.
 - c. Missing the point.
 - d. No fallacy.
 - e. Division.

32. Carbon monoxide is a poisonous gas. Therefore, its two components, carbon and oxygen, must be poisonous.
- a. Missing the point.
 - b. Division.
 - c. Begging the question.
 - d. Accident.
 - e. Weak analogy.

Select the best answer for the following multiple choice questions.

33. The *post hoc ergo propter hoc* fallacy is a variety of:
- a. False cause.
 - b. Appeal to authority.
 - c. Red herring.
 - d. Straw man.
 - e. Composition.
34. In which of the following statements is an attribute predicated collectively?
- a. Elephants are large.
 - b. Bathing beauties are appealing.
 - c. Roses are fragrant.
 - d. Lies are deceptive.
 - e. Brush fires are frequent.
35. The fallacy in which the arguer misinterprets an opponent's argument for the purpose of more easily attacking it is:
- a. Red herring.
 - b. False dichotomy.
 - c. Amphiboly.
 - d. Straw man.
 - e. Begging the question.
36. The bandwagon argument and the appeal to vanity are varieties of:
- a. Argument against the person.
 - b. Appeal to authority.
 - c. Appeal to the people.
 - d. False cause.
 - e. Missing the point.

37. The fallacy that always involves two arguers, at least implicitly, is:
- Equivocation.
 - Argument against the person.
 - Composition.
 - Begging the question.
 - False cause.
38. When an arguer leaves a crucial premise, whose truth is questionable, unexpressed, the fallacy committed is:
- Appeal to ignorance.
 - Complex question.
 - Slippery slope.
 - Begging the question.
 - Red herring.
39. Which of the following is a reason why people commit fallacies?
- Reasoning from the general to the particular.
 - Intent.
 - Unconsciousness.
 - Confusing induction with deduction.
 - Confusing truth with validity.
40. Equivocation and amphiboly are fallacies of:
- Relevance.
 - Presumption.
 - Grammatical analogy.
 - Vagueness.
 - Ambiguity.

Chapter 4 Test

(Each question is worth 2 points)

I. Questions 1 through 10 pertain to this statement: “No high school teachers who are not classroom entertainers are instructors who are not liked by their students.”

1. The copula is:
 - a. Are.
 - b. Are not.
 - c. Are not liked.
 - d. No.
 - e. Who are not classroom entertainers.
2. The subject term is:
 - a. High school teachers.
 - b. Instructors.
 - c. Instructors who are not liked by their students.
 - d. High school teachers who are not classroom entertainers.
 - e. Classroom entertainers.
3. The predicate term is:
 - a. Students.
 - b. Instructors.
 - c. Instructors who are not liked by their students.
 - d. High school teachers.
 - e. Classroom entertainers.
4. The quantifier is:
 - a. Universal.
 - b. Particular.
 - c. Are not.
 - d. Negative.
 - e. No.
5. The quantity is:
 - a. Negative.
 - b. Universal.
 - c. No.
 - d. Particular.
 - e. General.

6. The quality is:
- Universal.
 - Particular.
 - Negative.
 - Affirmative.
 - Are.
7. The letter name is:
- E.**
 - A.**
 - I.**
 - U.**
 - O.**
8. If both the quantity and the quality are changed, the resulting statement is:
- Some high school teachers who are classroom entertainers are instructors who are not liked by their students.
 - Some high school teachers who are not classroom entertainers are instructors who are not liked by their students.
 - All high school teachers who are not classroom entertainers are instructors who are liked by their students.
 - All high school teachers who are classroom entertainers are instructors who are not liked by their students.
 - Some high school teachers who are not classroom entertainers are not instructors who are not liked by their students.
9. If the quality but not the quantity is changed, then, for the resulting statement,
- The subject is particular, the predicate universal.
 - Both the subject and the predicate are distributed.
 - Both the subject and the predicate are undistributed.
 - The subject is undistributed and the predicate is distributed.
 - The subject is distributed and the predicate is undistributed.

10. If the quantity but not the quality is changed, then, for the resulting statement,

- a. The subject is particular, the predicate universal.
- b. Both the subject and the predicate are distributed.
- c. Both the subject and the predicate are undistributed.
- d. The subject is undistributed and the predicate is distributed.
- e. The subject is distributed and the predicate is undistributed.

II. In questions 11 through 17 below, you are given a statement, its truth value in parentheses, and an operation/relation to be performed on that statement. In questions 18 through 24, you are given a statement, its truth value in parentheses, and a new statement. You must determine how the new statement is related to the given statement and the truth value of the new statement. Assume the Aristotelian standpoint for these questions.

11. Some A are not non-B. (F)

Subalternation

- a. All A are non-B. (F)
- b. No A are non-B. (F)
- c. No A are non-B. (Und.)
- d. No non-B are A. (F)
- e. Some A are non-B. (T)

12. Some non-A are non-B. (T)

Obversion

- a. Some non-A are B. (Und.)
- b. Some B are not A. (T)
- c. Some non-A are not B. (T)
- d. No non-A are B. (F)
- e. All non-A are B. (T)

13. No A are B. (F)

Contrary

- a. All A are B. (Und.)
- b. No B are A. (F)
- c. No non-B are non-A. (Und.)
- d. All A are B. (T)
- e. Some A are B. (Und.)

14. Some A are not B. (T) Subcontrary
- a. Some non-B are not non-A. (T)
 - b. Some A are non-B. (Und.)
 - c. Some A are B. (F)
 - d. Some A are B. (Und.)
 - e. All A are B. (F)
15. All non-A are B. (T) Conversion
- a. All B are non-A. (T)
 - b. No non-A are non-B. (T)
 - c. All non-B are A. (Und.)
 - d. Some non-A are B. (T)
 - e. All B are non-A. (Und.)
16. Some A are non-B. (F) Contraposition
- a. No A are B. (F)
 - b. Some non-B are A. (F)
 - c. Some non-B are non-A. (Und.)
 - d. Some B are non-A. (Und.)
 - e. No A are non-B. (T)
17. Some non-A are not B. (F) Contradiction
- a. Some non-B are not A. (Und.)
 - b. No non-A are B. (T)
 - c. All non-A are B. (T)
 - d. Some non-A are B. (T)
 - e. No non-A are B. (F)
18. Some A are non-B. (F) Some non-B are A.
- a. Subcontrary. (T)
 - b. Conversion. (F)
 - c. Contraposition. (F)
 - d. Conversion. (Und.)
 - e. Contradiction. (T)

19. Some A are non-B. (T) No A are non-B.
 a. Subalternation. (T)
 b. Obversion. (T)
 c. Subalternation. (Und.)
 d. Contrary. (F)
 e. Contradiction. (F)
20. All non-A are B. (T) All non-B are A.
 a. Contraposition. (T)
 b. Subalternation. (F)
 c. Conversion. (Und.)
 d. Obversion. (T)
 e. Contraposition. (Und.)
21. All non-A are B. (F) Some non-A are B.
 a. Contradiction. (T)
 b. Subalternation. (Und.)
 c. Subcontrary. (T)
 d. Subcontrary. (F)
 e. Subalternation. (F)
22. All non-A are non-B. (T) No non-A are non-B.
 a. Subcontrary. Und.)
 b. Obversion. (T)
 c. Contrary. (F)
 d. Contraposition. (T)
 e. Contraposition. (Und.)
23. No A are non-B. (F) All A are B.
 a. Subalternation. (Und.)
 b. Contradiction. (F)
 c. Contrary. (Und.)
 d. Obversion. (F)
 e. Contrary. (T)

24. Some A are non-B. (F) Some A are not non-B.
- a. Obversion. (F)
 - b. Subcontrary. (T)
 - c. Subcontrary. (Und.)
 - d. Subalternation. (Und.)
 - e. Contraposition. (Und.)

III. Select the best answer for the following arguments

25. It is false that no ceramics are superconductors. Therefore, some ceramics are superconductors.
- a. Valid, illicit contrary.
 - b. Invalid, illicit subalternation.
 - c. Invalid, no named fallacy.
 - d. Invalid, illicit contraposition.
 - e. Valid; no fallacy.
26. Some clocks are not quartz controlled devices. Therefore, some clocks are quartz-controlled devices.
- a. Invalid, illicit subcontrary.
 - b. Valid, no fallacy.
 - c. Invalid, illicit subalternation.
 - d. Invalid, illicit conversion.
 - e. Invalid, existential fallacy.
27. All gnomes are reclusive dwarfs. Therefore, it is false that no gnomes are reclusive dwarfs.
- a. Valid, no fallacy.
 - b. Invalid, illicit contrary.
 - c. Invalid, existential fallacy.
 - d. Invalid, illicit obversion.
 - e. Valid, existential fallacy.
28. All fraudulent marriages are marriages that can be annulled. Therefore, all marriages that cannot be annulled are genuine marriages.
- a. Invalid, illicit contrary.
 - b. Invalid, illicit contraposition.
 - c. Invalid, illicit conversion.
 - d. Valid, no fallacy.
 - e. Valid, illicit contradiction.

29. Some photographers are not true artists. Therefore, some true artists are not photographers.
- Invalid, illicit contraposition.
 - Valid, no fallacy.
 - Invalid, illicit subcontrary.
 - Invalid, existential fallacy.
 - Invalid, illicit conversion.
30. No protons are negatively charged particles. Therefore, it is false that all protons are negatively charged particles.
- Invalid, illicit subcontrary.
 - Valid, no fallacy.
 - Invalid, illicit contrary.
 - Invalid, illicit subalternation.
 - Invalid, illicit contraposition.
31. No golfers are persons who succeed without practice. Therefore, some golfers are not persons who succeed without practice.
- Invalid, existential fallacy.
 - Invalid, illicit subcontrary.
 - Invalid, illicit subalternation.
 - Invalid, illicit conversion.
 - Valid, no fallacy.
32. It is false that all diamonds are things that last forever. Therefore, no diamonds are things that last forever.
- Valid, no fallacy.
 - Invalid, illicit subcontrary.
 - Invalid, illicit contrary.
 - Invalid, illicit conversion.
 - Invalid, illicit contraposition.
33. No public servants are people above the law. Therefore, all public servants are people subject to the law.
- Invalid, existential fallacy.
 - Invalid, illicit contraposition.
 - Invalid, illicit contrary.
 - Valid, no fallacy.
 - Invalid, illicit obversion.

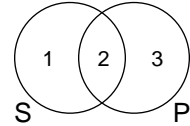
34. No centaurs are friendly animals. Therefore, some centaurs are not friendly animals.
- Invalid, existential fallacy.
 - Invalid, illicit subalternation.
 - Valid, no fallacy.
 - Invalid, illicit conversion.
 - Invalid, illicit contraposition.
35. Some surgeons are people who shun AIDS victims. Therefore, some people who do not shun AIDS victims are people other than surgeons.
- Invalid, illicit subcontrary.
 - Invalid, illicit contraposition.
 - Valid, no fallacy.
 - Invalid, illicit conversion.
 - Invalid, existential fallacy.
36. All fire-breathing dragons are menacing creatures. Therefore, it is false that some fire-breathing dragons are not menacing creatures.
- Invalid, illicit subalternation.
 - Invalid, illicit contrary.
 - Valid, no fallacy.
 - Invalid, illicit subcontrary.
 - Invalid, existential fallacy.
37. Some tennis players are not tantrum throwers. Therefore, no tennis players are tantrum throwers.
- Invalid, illicit contrary.
 - Invalid, illicit subcontrary.
 - Valid, no fallacy.
 - Invalid, illicit conversion.
 - Invalid, illicit subalternation.
38. Some mermaids are not attractive females. Therefore, some mermaids are unattractive females.
- Invalid, illicit subcontrary.
 - Invalid, existential fallacy.
 - Valid, no fallacy.
 - Invalid, illicit contraposition.
 - Valid, existential fallacy.

IV. Fill in the Venn diagrams for the following statement forms.

39. No S are P. (Boolean standpoint)

After filling in the Venn diagram,

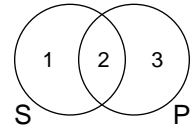
- Area 1 is shaded, and there are no other marks.
- Area 2 is shaded, and there is a circled X in Area 1.
- Area 3 is shaded.
- Area 2 is shaded, and there are no other marks.
- There is an X in Area 2.



40. All S are P. (Aristotelian standpoint)

After filling in the Venn diagram,

- There is an X in Area 2.
- There is an X in Area 1.
- Area 2 is shaded, and there is a circled X in Area 1.
- Area 3 is shaded, and there is a circled X in Area 2.
- Area 1 is shaded, and there is a circled X in Area 2.



VI. Select the best translation for the following categorical propositions.

41. There are exercise machines that are not expensive.

- Some exercise machines are not expensive things.
- Some expensive things are not exercise machines.
- No exercise machines are expensive things.
- Some exercise machines are not expensive.
- All exercise machines are not expensive things.

42. Not all photocopiers break down regularly.

- Some times are times photocopiers break down.
- Some photocopiers are not machines that break down regularly.
- All photocopiers are machines that do not break down regularly.
- No photocopiers are machines that break down regularly.
- Most photocopiers break down occasionally.

43. Only wealthy individuals are aristocrats.
- a. No people who are not aristocrats are wealthy individuals.
 - b. All wealthy individuals are aristocrats.
 - c. Some aristocrats are wealthy individuals.
 - d. Some aristocrats are wealthy individuals and some aristocrats are not wealthy individuals.
 - e. All aristocrats are wealthy individuals.
44. Isaac Newton invented the calculus.
- a. All people who invented the calculus are people identical to Isaac Newton.
 - b. Some people who invented the calculus are people identical to Isaac Newton.
 - c. All people identical to Isaac Newton are people who invented the calculus.
 - d. All people like Isaac Newton are people who invented the calculus.
 - e. All people identical to Isaac Newton are identical to people who invented the calculus.
45. Tools will rust if they are made of iron.
- a. All tools are tools that rust if they are made of iron.
 - b. All tools that rust are tools made of iron.
 - c. Some tools rust and some tools do not rust.
 - d. All tools made of iron are tools that will rust.
 - e. If tools are made of iron, then they will rust.
46. Oil spills are not healthy for marine life.
- a. No oil spills are healthy things for marine life.
 - b. Some oil spills are not healthy things for marine life.
 - c. All oil spills are not healthy things for marine life.
 - d. No oil spills are healthy for marine life.
 - e. All varieties of marine life are things killed by oil spills.
47. She eats whatever she wants.
- a. All things she eats are things she wants to eat.
 - b. All things she wants to eat are things she eats.
 - c. All persons identical to her are persons who eat what they want.
 - d. Some things she eats are things she wants and some things she eats are not things she wants.
 - e. All she eats is what she wants.

48. A car pollutes the atmosphere whenever it runs poorly.
- a. All times a car pollutes the atmosphere are times a car runs poorly.
 - b. All cars that pollute the atmosphere are cars that run poorly.
 - c. All times a car runs poorly are times a car pollutes the atmosphere.
 - d. If a car runs poorly, then it pollutes the atmosphere.
 - e. All cars pollute the atmosphere whenever they run poorly.
49. Pets are intolerable unless they are housebroken.
- a. All pets are intolerable if they are not housebroken.
 - b. All pets that are housebroken are pets that are tolerable.
 - c. All pets that are intolerable are pets that are not housebroken.
 - d. No pets that are intolerable are pets that are not housebroken.
 - e. All pets that are tolerable are pets that are housebroken.
50. Few stockbrokers are totally candid salespeople.
- a. No stockbrokers are totally candid salespeople.
 - b. Some stockbrokers are totally candid salespeople.
 - c. Some stockbrokers are not totally candid salespeople.
 - d. Some stockbrokers are totally candid salespeople and some stockbrokers are not totally candid salespeople.
 - e. All stockbrokers are not totally candid salespeople.

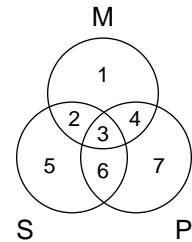
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Chapter 5 Test

(Each question is worth 2½ points)

Select the correct answer to the following questions.

1. Given the following syllogism,
 Some P are M.
 All S are M.
 Some S are P.



After filling in the Venn diagram,

- Areas 1 and 4 are shaded, and there is an X in Area 3.
 - Areas 5 and 6 are shaded, and there is an X in Area 4.
 - Areas 2 and 3 are shaded, and there is an X in Area 4.
 - Areas 5 and 6 are shaded, and there is an X on the line between Areas 3 and 4.
 - Area 5 is shaded, and there is an X on the line between Areas 3 and 4.
2. For the syllogism in problem 1, the correct mood and figure is:
- IAI-2**
 - AIA-2**
 - IAO-4**
 - IAI-3**
 - IEI-1**
3. For the syllogism in problem 1, the correct answer from the Boolean standpoint is:
- Invalid, illicit major.
 - Invalid, exclusive premises.
 - Invalid, drawing an affirmative conclusion from a negative premise.
 - Valid, no fallacy.
 - Invalid, undistributed middle.

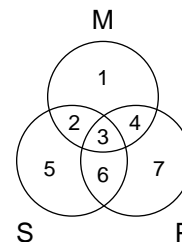
4. Given the following syllogism,

No M are P.

All M are S.
No S are P.

After filling in the Venn diagram,

- Areas 1, 3, 4, and 6 are shaded.
- Areas 1, 2, and 3 are shaded.
- Areas 1, 3, and 4 only are shaded.
- Areas 1 and 4 only are shaded.
- Areas 1, 3, 4, and 6 are shaded, and there is an X in Area 2.



5. For the syllogism in problem 4, the correct mood and figure is:

- AEA-2**
- EAE-3**
- IAI-3**
- AEA-2**
- EAE-2**

6. For the syllogism in problem 4, the correct answer from the Boolean standpoint is:

- Invalid, existential fallacy.
- Invalid, drawing a negative conclusion from affirmative premises.
- Invalid, illicit minor.
- Valid, no fallacy.
- Invalid, exclusive premises.

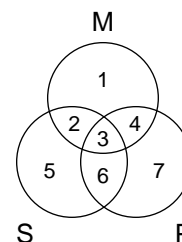
7. Given the following syllogism,

No P are M.

Some M are not S.
Some S are not P.

After filling in the Venn diagram,

- Areas 3 and 4 are shaded, and there is an X in Area 1.
- Area 4 only is shaded, and there is an X on the line between Areas 2 and 3.
- Areas 6 and 7 are shaded, and there is an X in the line between Areas 1 and 4.
- Areas 3 and 4 are shaded, and there is an X on the line between Areas 1 and 2.
- Areas 1 and 2 are shaded, and there is an X in Area 4.



8. For the syllogism in problem 7, the correct mood and figure is:

- a. **AII-3**
- b. **IOO-1**
- c. **IEE-4**
- d. **E00-4**
- e. **IEI-2**

9. For the syllogism in problem 7, the correct answer from the Boolean standpoint is:

- a. Invalid, undistributed middle.
- b. Invalid, illicit major.
- c. Invalid, existential fallacy.
- d. Valid, no fallacy.
- e. Invalid, exclusive premises.

10. Given the following syllogism,

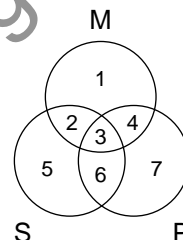
All P are M.

No M are S.

Some S are not P.

After filling in the Venn diagram,

- a. Areas 2, 6, and 7 only are shaded.
- b. Areas 2, 3, 6, and 7 are shaded, and no Xs appear in the diagram.
- c. Areas 1, 3, and 4 are shaded.
- d. Areas 2, 3, 6, and 7 are shaded, and there is an X in Area 5.
- e. Areas 2, 3, and 7 only are shaded, and there is an X on the line between Areas 5 and 6.



11. For the syllogism in problem 10, the correct mood and figure is:

- a. **AIO-1**
- b. **EOA-4**
- c. **AEO-2**
- d. **AEO-4**
- e. **EOA-3**

12. For the syllogism in problem 10, the correct answer from the Boolean standpoint is:

- a. Invalid, drawing a negative conclusion from affirmative premises.
- b. Valid, no fallacy.
- c. Invalid, existential fallacy.
- d. Invalid, illicit minor.
- e. Invalid, exclusive premises.

13. Given the following syllogism,

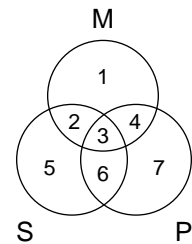
No M are P.

All S are M.

No S are P.

After filling in the Venn diagram,

- Areas 3, 4, 5, and 6 are shaded.
- Areas 1, 2, and 3 are shaded.
- Areas 3, 4, and 5 only are shaded.
- Areas 2, 3, 6, and 7 are shaded.
- Areas 4, 5, and 6 only are shaded.



14. For the syllogism in problem 13, the correct mood and figure is:

- AEA-3**
- EAE-4**
- IEI-4**
- EIE-1**
- EAE-1**

15. For the syllogism in problem 13, the correct answer from the Boolean standpoint is:

- Invalid, existential fallacy.
- Invalid, illicit major.
- Valid, no fallacy.
- Invalid, undistributed middle.
- Invalid, drawing an affirmative conclusion from a negative premise.

16. Given the following syllogism,

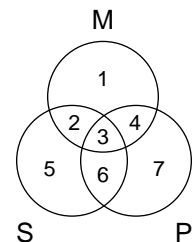
All M are P.

Some S are not M.

Some S are P.

After filling in the Venn diagram,

- Areas 3 and 4 are shaded, and there is an X on the line between Areas 5 and 6.
- Areas 1 and 2 are shaded, and there is an X on the line between Areas 5 and 6.
- Area 1 only is shaded, and there is an X on the line between Areas 2 and 3.
- Areas 1 and 2 are shaded, and there is an X in Area 5.
- Areas 1 and 2 are shaded, and there is an X in Area 6.



17. For the syllogism in problem 16, the correct mood and figure is:
- AIO-1**
 - EOI-4**
 - AOI-1**
 - EIO-4**
 - EOI-4**
18. For the syllogism in problem 16, the correct answer from the Boolean standpoint is:
- Invalid, drawing an affirmative conclusion from a negative premise.
 - Invalid, exclusive premises.
 - Invalid, undistributed middle.
 - Valid, no fallacy.
 - Invalid, illicit minor.
19. Given the following syllogism:
- No turkeys are animals.
 All turkeys are antelopes.

 Some antelopes are not animals.
- This syllogism:
- Is valid from only the Boolean standpoint.
 - Is valid from only the Aristotelian standpoint.
 - Is valid from both standpoints.
 - Is invalid from both standpoints.
 - Commits the existential fallacy from both standpoints.
20. Given the following syllogism,
- No nonsmokers are persons with an altered life span, for all
 smokers are persons with an unhealthy lifestyle and no
 persons with a healthy lifestyle are persons with an unaltered
 life span.
- After reducing the number of terms, the conclusion is:
- All smokers are persons with an altered life span.
 - All persons with a healthy lifestyle are persons with an altered life span.
 - All persons with an altered life span are smokers.
 - No smokers are persons with a healthy lifestyle.
 - All persons with an altered life span are persons with a healthy lifestyle.

21. In Question 20, after reducing the number of terms, the major premise is:
- All smokers are persons with an altered life span.
 - All persons with a healthy lifestyle are persons with an altered life span.
 - All persons with an altered life span are smokers.
 - All persons with an altered life span are persons with a healthy lifestyle.
 - No smokers are persons with a healthy lifestyle.
22. In Question 20, after reducing the number of terms, the minor premise is:
- All persons with a healthy lifestyle are persons with an altered life span.
 - All smokers are persons with an altered life span.
 - No smokers are persons with a healthy lifestyle.
 - All persons with an altered life span are smokers.
 - All persons with an altered life span are persons with a healthy lifestyle.
23. Given the following syllogism,
No mechanized beings are beings able to think, so some
unconscious beings are not beings unable to think, since some
nonmechanized beings are conscious beings.
After reducing the number of terms, the conclusion is:
- Some conscious beings are not beings able to think.
 - No mechanized beings are conscious beings.
 - Some conscious beings are not mechanized beings.
 - Some beings able to think are not conscious beings.
 - No mechanized beings are beings able to think.
24. In Question 23, after reducing the number of terms, the major premise is:
- Some beings able to think are not conscious beings.
 - No mechanized beings are beings able to think.
 - Some conscious beings are not beings able to think.
 - All mechanized beings are conscious beings.
 - Some conscious beings are not mechanized beings.
25. In Question 23, after reducing the number of terms, the minor premise is:
- Some conscious beings are not beings able to think.
 - No mechanized beings are beings able to think.
 - No mechanized beings are conscious beings.
 - Some beings able to think are not conscious beings.
 - Some conscious beings are not mechanized beings.

26. Given the following syllogism,

Whenever oil prices rise, airline profits decline, so airline profits must be declining now, since oil prices are rising now.

After translating into standard form, the conclusion is:

- a. All current times are times oil prices are rising.
- b. All times airline profits decline are times oil prices rise.
- c. All times oil prices are rising are current times.
- d. No current times are times oil prices are declining.
- e. All current times are times airline profits are declining.

27. For Question 26, the major premise is:

- a. All current times are times oil prices are rising.
- b. All times airline profits decline are times oil prices rise.
- c. All times oil prices are rising are times airline profits are declining.
- d. Now is the time when oil prices rise.
- e. Airline profits are declining now.

28. For Question 26, the minor premise is:

- a. No current times are times oil prices are rising.
- b. All current times are times oil prices are rising.
- c. When oil prices rise, airline profits decline.
- d. All times oil prices are rising are current times.
- e. All times oil prices are rising are times airline profits decline.

29. Given the following syllogism,

Libya is not a free country, because countries are not free unless they are democracies, and Libya is not a democracy.

After translating into standard form, the conclusion is:

- a. All free countries are democracies.
- b. All democracies are free countries.
- c. All countries identical to Libya are not free countries.
- d. No countries identical to Libya are free countries.
- e. No countries identical to Libya are democracies.

30. For Question 29, the major premise is:

- a. All free countries are democracies.
- b. No countries identical to Libya are democracies.
- c. No countries that are not democracies are free countries.
- d. All democracies are free countries.
- e. No countries identical to Libya are free countries.

31. For Question 29, the minor premise is:

- a. No countries identical to Libya are free countries.
- b. No countries identical to Libya are democracies.
- c. All free countries are democracies.
- d. All democracies are free countries.
- e. All countries identical to Libya are not democracies.

32. Given the following enthymeme,

People with no sense of humor are bores, but Kathy is not a bore.

The statement needed to convert the enthymeme into a valid syllogism is:

- a. No persons identical to Kathy are bores. (Premise)
- b. No bores are people with a sense of humor. (Conclusion)
- c. Kathy has a sense of humor. (Conclusion)
- d. Kathy has a sense of humor. (Premise)
- e. Kathy has a vibrant personality. (Conclusion)

33. Given the following enthymeme,

Immoderate behaviors are unhealthy, so alcohol bingeing must be unhealthy.

The statement needed to convert the enthymeme into a valid syllogism is:

- a. Alcohol bingeing is an immoderate behavior. (Premise)
- b. George sometimes binges on alcohol. (Premise)
- c. Alcohol bingeing is reckless. (Premise)
- d. Immoderate behavior is never a good idea. (Conclusion)
- e. Alcohol bingeing is always unhealthy. (Premise)

34. Given the following enthymeme,

Whoever takes aspirin has a reduced risk of heart attack, so Mabel has a reduced risk of heart attack.

The statement needed to convert the enthymeme into a valid syllogism is:

- a. Taking aspirin is recommended by many cardiologists. (Premise)
- b. By taking aspirin, Mabel is reducing her risk of heart attack. (Premise)
- c. Mabel once had a heart attack. (Premise)
- d. Mabel takes aspirin. (Premise)
- e. Aspirin prevents heart attacks. (Conclusion)

35. Given the following enthymeme,

Whatever runs on fuel cells does not pollute the atmosphere,
and a few cars run on fuel cells.

The statement needed to convert the enthymeme into a valid syllogism is:

- a. Fuel cells burn hydrocarbons. (Premise)
- b. Very few cars run on fuel cells. (Conclusion)
- c. The atmosphere can never be cleaned up completely. (Premise)
- d. A few cars do not pollute the atmosphere. (Conclusion)
- e. All cars pollute the atmosphere to some degree. (Conclusion)

36. Given the following sorites,

All M are R.

Some J are P.

No K are R.

All J are M.

Some P are not K.

The correct standard form is:

a.
All J are M.
All M are R.
Some J are P.
No K are R.
Some P are not K.

b.
Some J are P.
All J are M.
No K are R.
All M are R.
Some P are not K.

c.
No K are R.
Some J are P.
All M are R.
All J are M.
Some P are not K.

d.
No K are R.
Some P are not K.
Some J are P.
All J are M.
All M are R.

e.
No K are R.
All M are R.
All J are M.
Some J are P.
Some P are not K.

37. For Question 36, the first intermediate conclusion is:

- a. Some P are M.
- b. All J are R.
- c. Some J are M.
- d. Some P are not M.
- e. No K are M.

38. For Question 36, the second intermediate conclusion is:

- a. All J are R.
- b. Some J are R.
- c. No J are K.
- d. Some J are not M.
- e. Some J are M.

39. For Question 36, the correct answer is:

- a. Sound.
- b. Valid.
- c. Unsound.
- d. Invalid.
- e. Strong.

40. Given the following sorites:

All K are N.

No N are F.

Some H are F.

All R are H.

Some R are not K.

This sorites is:

- a. Invalid because one of its middle terms is undistributed.
- b. Invalid because it has more than two affirmative premises.
- c. Invalid because it draws a particular conclusion from more than two universal premises.
- d. Invalid because it has more than two affirmative premises.
- e. Valid because it breaks no rules.

Chapter 6 Test

(Except for the double-credit questions, each question is worth 2 points)

Select the correct translation for the statements in Problems 1–10.

1. Argentina will reduce unemployment and Brazil will cut taxes, or Colombia will support agrarian reform.
 - a. $A \vee (B \bullet C)$
 - b. $A \bullet (B \vee C)$
 - c. $(A \vee B) \bullet C$
 - d. $(A \bullet B) \vee C$
 - e. $A \bullet B \vee C$
2. Argentina will reduce unemployment if either Brazil cuts taxes or Colombia supports agrarian reform.
 - a. $(B \vee C) \supset A$
 - b. $B \supset (C \supset A)$
 - c. $A \supset (B \vee C)$
 - d. $B \vee C \supset A$
 - e. $(B \bullet C) \supset A$
3. Both Argentina will reduce unemployment and Brazil will cut taxes provided that Colombia supports agrarian reform.
 - a. $C \supset (A \vee B)$
 - b. $(A \bullet B) \supset C$
 - c. $C \supset (A \bullet B)$
 - d. $C \supset (A \supset B)$
 - e. $C \equiv (A \bullet B)$
4. If Argentina reduces unemployment then if Brazil cuts taxes then both Colombia will support agrarian reform and the Dominican Republic will increase government spending.
 - a. $(A \supset B) \equiv (C \supset D)$
 - b. $A \supset [(B \supset (C \bullet D))]$
 - c. $(A \bullet B) \supset (C \supset D)$
 - d. $(A \supset B) \supset (C \bullet D)$
 - e. $[(A \supset B) \supset C] \bullet D$

5. If Argentina's reducing unemployment implies that either Brazil cuts taxes or Colombia supports agrarian reform, then the Dominican Republic will increase government spending.
 - a. $(A \supset B) \vee (C \supset D)$
 - b. $(B \vee C) \supset (A \supset D)$
 - c. $A \supset [(B \vee C) \supset D]$
 - d. $(A \supset D) \vee (C \supset D)$
 - e. $[A \supset (B \vee C)] \supset D$

6. Argentina will reduce unemployment only if neither Brazil cuts taxes nor Colombia supports agrarian reform.
 - a. $(\sim B \bullet \sim C) \supset A$
 - b. $A \supset \sim(B \vee C)$
 - c. $A \supset (\sim B \vee \sim C)$
 - d. $\sim(B \vee C) \supset A$
 - e. $(\sim B \vee \sim C) \supset A$

7. It is not the case that Argentina will reduce unemployment unless not both Brazil cuts taxes and Colombia supports agrarian reform.
 - a. $\sim A \supset \sim(B \bullet C)$
 - b. $\sim(B \bullet C) \supset \sim A$
 - c. $\sim A \vee \sim(B \bullet C)$
 - d. $\sim A \supset (\sim B \bullet \sim C)$
 - e. $\sim A \vee (\sim B \bullet \sim C)$

8. Argentina will reduce unemployment if and only if both Brazil and Colombia do not devalue their currency.
 - a. $(A \supset \sim B) \bullet (A \supset \sim C)$
 - b. $(A \supset \sim B) \bullet (\sim B \supset A)$
 - c. $A \equiv \sim(B \bullet C)$
 - d. $(A \equiv \sim B) \bullet (A \equiv \sim C)$
 - e. $A \equiv (\sim B \bullet \sim C)$

9. Argentina's reducing unemployment is a sufficient condition for Brazil to cut taxes unless Colombia's supporting agrarian reform is a necessary condition for the Dominican Republic to increase government spending.
- $(A \supset B) \vee (D \supset C)$
 - $(B \supset A) \vee (C \supset D)$
 - $(A \supset B) \vee (C \supset D)$
 - $(A \equiv B) \vee (C \equiv D)$
 - $(A \supset B) \supset (D \supset C)$
10. If Argentina's reducing unemployment is a sufficient and necessary condition for both Brazil to cut taxes and Colombia to support agrarian reform, then the Dominican Republic will increase government spending.
- $[(A \supset B) \cdot (C \supset A)] \supset D$
 - $[A \equiv (B \cdot C)] \supset D$
 - $[(B \cdot C) \supset A] \supset D$
 - $[(A \equiv (B \cdot C))] \equiv D$
 - $(A \equiv B) \cdot (C \equiv D)$

Given that A and B are true and X and Y are false, determine the truth values of the propositions in Problems 11 and 13.

11. $[(A \supset X) \vee (Y \supset B)] \equiv \sim[(A \vee X) \cdot (B \vee Y)]$
- True.
 - False.
12. The main operator in the proposition in Question 11 is a:
- Horseshoe.
 - Dot.
 - Wedge.
 - Triple bar.
 - Tilde.
13. $[(A \cdot X) \vee (B \cdot \sim Y)] \supset [(A \equiv \sim X) \cdot (Y \equiv \sim B)]$
- True.
 - False.

14. The main operator in the proposition in Question 13 is a:

- a. Triple bar.
- b. Dot.
- c. Horseshoe.
- d. Tilde.
- e. Wedge.

Use ordinary truth tables to answer Problems 15–27. Answer these questions as per the exercises in the textbook.

15. Given the statement: $(A \supset B) \equiv \sim(B \vee \sim A)$.

This statement is:

- a. Contingent.
- b. Absolute.
- c. Tautologous.
- d. Consistent.
- e. Self-contradictory.

16. The truth table in Problem 15 has how many lines?

- a. Two.
- b. Eight.
- c. Four.
- d. Six.
- e. Nine.

17. Given the statement: $(A \supset B) \supset [(A \vee B) \supset B]$.

This statement is:

- a. Tautologous.
- b. Contingent.
- c. Probable.
- d. Self-contradictory.
- e. Inconsistent.

18. Given the statement: $(A \equiv \sim B) \bullet (C \equiv \sim A)$.

This statement is:

- a. Valid.
- b. Self-contradictory.
- c. Inconsistent.
- d. Tautologous.
- e. Contingent.

19. The truth table in Problem 18 has how many lines?

- a. Four.
- b. Nine.
- c. Eight.
- d. Six.
- e. Twelve.

Note: Problems 20, 22, 24, 26, 28, 30, 32, and 34 below are more difficult than the rest of the problems on this test. For this reason, they are given double credit.

20. Given the pair of statements: $(A \bullet \sim B) \vee (B \bullet \sim A)$ and $(B \supset \sim A) \bullet (\sim B \supset A)$.

These statements are:

- a. Inconsistent.
- b. Contradictory.
- c. Invalid.
- d. Logically equivalent.
- e. Consistent.

21. Select the same answer as Problem 20.

22. Given the pair of statements: $A \vee (B \bullet C)$ and $\sim (B \vee \sim C) \bullet \sim A$.

These statements are:

- a. Logically equivalent.
- b. Valid.
- c. Consistent.
- d. Contradictory.
- e. Inconsistent.

23. Select the same answer as Problem 22.

24. Given the argument: $A \equiv \sim B / A \vee B // B \bullet \sim A$.

This argument is:

- a. Invalid; fails in 4th line.
- b. Valid.
- c. Invalid; fails in 2nd line.
- d. Invalid; fails in 1st line.
- e. Invalid; fails in 3rd line.

25. Select the same answer as Problem 24.

26. Given the argument: $A \supset B / B \supset C / A \vee C // B \vee C$.

This argument is:

- a. Invalid; fails in 4th line.
- b. Valid.
- c. Invalid; fails in 6th line.
- d. Invalid; fails in 2nd line.
- e. Invalid; fails in 3rd line.

27. Select the same answer as Problem 26.

Use indirect truth tables to answer Problems 28–35.

28. Given the argument: $(A \bullet B) \vee (C \bullet D) / B \supset (E \bullet F) / D \supset (G \bullet H) // F \vee H$.

This argument is:

- a. Valid.
- b. Uncogent.
- c. Invalid.
- d. Cogent.
- e. Sound.

29. Select the same answer as Problem 28.

30. Given the argument: $A \vee B / A \supset (C \bullet D) / B \supset (E \bullet F) // D \bullet F$.

This argument is:

- a. Cogent.
- b. Invalid.
- c. Sound.
- d. Valid.
- e. Uncogent.

31. Select the same answer as Problem 30.

32. Given these statements: $A \supset (B \supset C) / D \supset (C \supset F) / A \supset D / F \supset \sim B / A \bullet B$.

These statements are:

- a. Invalid.
- b. Tautologous.
- c. Consistent.
- d. Logically equivalent.
- e. Inconsistent.

33. Select the same answer as Problem 32.

34. Given these statements: $(A \bullet B) \supset C / (D \bullet C) \supset E / E \supset B / A \supset D / A \vee B$.

These statements are:

- a. Inconsistent.
- b. Tautologous.
- c. Consistent.
- d. Contradictory.
- e. Valid.

35. Select the same answer as Problem 34.

Determine whether the following arguments are valid or invalid by identifying the form of each. In some cases the argument must be rewritten using double negation or commutativity before it has a named form. Those arguments without a specific name are invalid.

36. $G \vee H$

$$\frac{\sim H}{G}$$

- a. Disjunctive syllogism—valid.
- b. Modus ponens—valid.
- c. Modus tollens—valid.
- d. Invalid.
- e. Denying the antecedent—invalid.

37. $\sim J$

$$\frac{E \supset \sim J}{E}$$

- a. Pure hypothetical syllogism—valid.
- b. Modus ponens—valid.
- c. Denying the antecedent—invalid.
- d. Modus tollens—valid.
- e. Affirming the consequent—invalid.

38. $(\sim S \supset D) \bullet (S \supset \sim E)$

$$\frac{S \vee \sim S}{D \vee \sim E}$$

- a. Modus ponens—valid.
- b. Invalid.
- c. Constructive dilemma—valid.
- d. Denying the antecedent—invalid.
- e. Destructive dilemma—valid.

39. $J \vee \sim Q$

$$\frac{\sim Q}{\sim J}$$

- Disjunctive syllogism—valid.
- Invalid.
- Denying the antecedent—invalid.
- Modus tollens—valid.
- Affirming the consequent—invalid.

40. $\sim F \supset N$

$$\frac{P \supset \sim F}{P \supset N}$$

- Pure hypothetical syllogism—valid.
- Constructive dilemma—valid.
- Invalid.
- Destructive dilemma—valid.
- Modus ponens—valid.

41. $K \supset \sim T$

$$\frac{T}{\sim K}$$

- Modus ponens—valid.
- Pure hypothetical syllogism—valid.
- Affirming the consequent—invalid.
- Modus tollens—valid.
- Invalid.

42. $E \supset \sim H$

$$\frac{H \supset \sim B}{E \supset B}$$

- Disjunctive syllogism—valid.
- Destructive dilemma—valid.
- Invalid.
- Modus ponens—valid.
- Pure hypothetical syllogism—valid.

43. $\sim M \supset D$

$$\frac{M}{\sim D}$$

- a. Invalid.
- b. Affirming the consequent—invalid.
- c. Modus ponens—valid.
- d. Denying the antecedent—invalid.
- e. Modus tollens—valid.

44. $(A \supset \sim R) \cdot (\sim T \supset C)$

$$\frac{R \vee \sim C}{\sim A \vee T}$$

- a. Pure hypothetical syllogism—valid.
- b. Constructive dilemma—valid.
- c. Invalid.
- d. Affirming the consequent—invalid.
- e. Destructive dilemma—valid.

45. $\sim B \supset \sim N$

$$\frac{\sim B}{\sim N}$$

- a. Denying the antecedent—invalid.
- b. Modus ponens—valid.
- c. Affirming the consequent—invalid.
- d. Modus tollens—valid.
- e. Invalid.

Select the best answer in problems 46–50.

46. Grasping a dilemma by the horns means:

- a. Proving the dilemma unsound by proving the conjunctive premise false.
- b. Proving the dilemma invalid by proving the disjunctive premise false.
- c. Proving the dilemma invalid by proving the conjunctive premise false.
- d. Proving the dilemma unsound by proving the disjunctive premise false.
- e. Proving the dilemma unsound by proving it invalid.

47. When the disjunctive premise of a dilemma is a tautology, then it is impossible to:
- Grasp it by the horns.
 - Construct a counterdilemma.
 - Escape between the horns.
 - Prove it valid.
 - Prove it sound.
48. If an ordinary truth table is constructed for an invalid argument, then
- There may be one line that has true premise(s) and false conclusion.
 - There must be exactly one line that has true premise(s) and false conclusion.
 - There must be at least one line that has true premise(s) and false conclusion.
 - There must be at least one line that has false premise(s) and true conclusion.
 - There is no line that has true premise(s) and false conclusion.
49. Suppose an indirect truth table is constructed for an argument, and the truth table requires more than one line. If a contradiction is obtained on the first line, then
- The argument is valid.
 - The second line of the truth table must be completed.
 - The argument is invalid.
 - The argument is unsound.
 - The argument is sound.
50. Suppose an indirect truth table is constructed for a series of statements, and the truth table requires more than one line. If no contradiction is reached on the first line, then
- The second line in the truth table must be completed.
 - The statements are contingent.
 - The statements are inconsistent.
 - The statements could still fail on the second line.
 - The statements are consistent.

Chapter 7 Test

(The questions in Part I are worth 2 points each, and the questions in Part II are worth 10 points each.)

I. Select the conclusion that follows in a single step from the given premises.
(Hint: Begin by examining the answers.)

1. 1. $\sim(\sim H \bullet \sim K)$
 2. $(H \bullet \sim K) \vee (H \bullet \sim N)$
 3. $(H \supset \sim K) \bullet (K \supset \sim H)$
 - a. $H \bullet \sim N$ 1, 2, DS
 - b. $H \bullet K$ 1, DN
 - c. $H \equiv \sim K$ 3, Equiv
 - d. $H \bullet (\sim K \vee \sim N)$ 2, Dist
 - e. $H \vee K$ 1, DM

2. 1. $(S \vee C) \supset R$
 2. $E \bullet (S \vee C)$
 3. $E \vee (\sim S \vee \sim C)$
 - a. $(E \vee \sim S) \vee \sim C$ 3, Assoc
 - b. R 1, 2, MP
 - c. $(E \vee S) \bullet (E \vee C)$ 2, Dist
 - d. $S \vee (C \supset R)$ 1, Assoc
 - e. $E \vee \sim(S \vee C)$ 3, DM

3. 1. $A \supset (L \bullet M)$
 2. $M \supset D$
 3. $\sim(L \bullet M)$
 - a. $A \supset D$ 1, 2, HS
 - b. $(A \supset L) \supset M$ 1, Exp
 - c. $(M \supset D) \vee E$ 2, Add
 - d. $D \supset M$ 2, Com
 - e. $\sim L \bullet \sim M$ 3, DM

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4. 1. $\sim(F \bullet N) \vee \sim(F \bullet N)$
 2. $F \bullet N$
 3. $Q \supset (F \bullet N)$
- a. Q 2, 3, MP
 b. $\sim(F \bullet N)$ 1, Taut
 c. $(\sim F \vee \sim N) \vee (\sim F \vee \sim N)$ 1, DM
 d. $\sim(F \bullet N)$ 1, 2, DS
 e. $(Q \supset F) \bullet N$ 3, Assoc
5. 1. $\sim\sim G$
 2. $\sim(S \bullet \sim P)$
 3. $(S \bullet \sim P) \vee \sim G$
- a. $\sim S \vee P$ 2, DM
 b. $S \bullet \sim P$ 1, 3, DS
 c. $\sim S$ 2, Simp
 d. $S \bullet (\sim P \vee \sim G)$ 3, Assoc
 e. $\sim G$ 2, 3, DS
6. 1. H
 2. $N \vee \sim H$
 3. $(N \vee \sim H) \supset \sim P$
- a. $H \bullet D$ 1, Add
 b. $H \supset N$ 2, Impl
 c. $\sim P$ 2, 3, MP
 d. N 1, 2, DS
 e. $N \vee (\sim H \supset \sim P)$ 3, Assoc
7. 1. $(H \supset \sim D) \bullet (R \supset \sim D)$
 2. $R \vee H$
 3. R
- a. $(R \supset \sim D) \bullet (H \supset \sim D)$ 1, Com
 b. H 2, 3, MP
 c. $\sim D \vee \sim D$ 1, 2, CD
 d. $\sim(\sim R \bullet \sim H)$ 2, DM
 e. $\sim D$ 1, 3, MP

8. 1. $\sim F \vee \sim F$
 2. $Q \equiv A$
 3. $\sim(Q \equiv A) \vee F$
- a. $(Q \supset A) \cdot (\sim A \supset \sim Q)$ 2, Equiv
 b. F 2, 3, DS
 c. $\sim(Q \equiv A)$ 1, 3, DS
 d. $(Q \equiv A) \supset F$ 3, Impl
 e. F 1, DN
9. 1. $E \cdot \sim R$
 2. $J \supset \sim(E \cdot \sim R)$
 3. $R \supset (\sim E \cdot \sim E)$
- a. $\sim R$ 1, Simp
 b. $\sim(\sim E \vee R)$ 1, DM
 c. $\sim J$ 1, 2, MT
 d. $R \supset E$ 3, DN
 e. $J \supset (\sim E \vee \sim R)$ 2, DM
10. 1. $M \vee \sim P$
 2. $(M \supset \sim B) \cdot (\sim P \supset F)$
 3. $\sim P \supset E$
- a. $\sim P \supset F$ 2, Simp
 b. $\sim B \vee F$ 1, 2, CD
 c. $P \vee E$ 3, Impl
 d. $\sim(\sim M \cdot P)$ 1, DM
 e. $M \supset E$ 1, 3, HS
11. 1. $\sim N$
 2. $\sim(R \cdot I)$
 3. $(N \vee G) \supset (R \cdot I)$
- a. $\sim R \cdot \sim I$ 2, DM
 b. $\sim R$ 2, Simp
 c. $\sim \sim N$ 1, DN
 d. $\sim(N \vee G)$ 2, 3, MT
 e. G 1, 3, DS

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12. 1. $T \equiv (\sim S \bullet \sim S)$

2. $T \supset (S \bullet R)$

3. $\sim S \bullet \sim R$

a. $(T \supset S) \bullet (T \supset R)$

2, Dist

b. $T \supset S$

2, Simp

c. $(T \bullet \sim S) \vee (\sim T \bullet \sim \sim S)$

1, Equiv

d. $\sim T$

2, 3, MT

e. $T \equiv \sim S$

1, DN

13. 1. $\sim(E \vee I)$

2. $(Q \bullet B) \supset (E \vee I)$

3. $\sim E$

a. $\sim Q \bullet \sim B$

1, 2, MT

b. $\sim E \vee \sim I$

1, DM

c. $Q \supset [B \supset (E \vee I)]$

2, Exp

d. I

1, 3, DS

e. $\sim E \bullet K$

3, Add

14. 1. $\sim(A \bullet T)$

2. $\sim H \supset F$

3. $(\sim A \bullet T) \supset \sim H$

a. $\sim F \supset H$

2, Trans

b. $(\sim A \bullet T) \supset F$

2, 3, HS

c. $\sim A \bullet \sim T$

1, DM

d. $H \vee F$

2, Impl

e. $\sim H$

1, 3, MP

15. 1. $(S \supset C) \bullet (R \supset D)$

2. $C \vee D$

3. $\sim C \bullet \sim R$

a. $S \supset C$

1, Simp

b. $S \vee R$

1, 2, CD

c. $\sim(\sim C \bullet \sim D)$

2, DM

d. C

2, Simp

e. $C \bullet R$

3, DN

16. 1. $(E \supset J) \cdot (B \supset N)$
 2. E
 3. $E \equiv B$
- a. $(E \vee B) \cdot (\sim E \vee \sim B)$ 3, Equiv
 b. B 2, 3, MP
 c. $(E \equiv B) \cdot E$ 2, 3, Conj
 d. $J \vee N$ 1, 3, CD
 e. J 1, 2, MP
17. 1. $(S \cdot \sim K) \vee (\sim S \cdot \sim \sim K)$
 2. $\sim S \cdot K$
 3. $M \supset S$
- a. $S \equiv \sim K$ 1, Equiv
 b. $\sim S \cdot \sim \sim K$ 1, 2, DS
 c. $\sim M$ 2, 3, MT
 d. $(S \cdot \sim K) \vee \sim (S \cdot \sim K)$ 1, DM
 e. $\sim (S \vee \sim K)$ 2, DM
18. 1. $(H \cdot Q) \supset D$
 2. $\sim F \supset \sim (H \cdot Q)$
 3. $H \cdot Q$
- a. $\sim F \supset D$ 1, 2, HS
 b. $\sim F \supset (\sim H \cdot \sim Q)$ 2, DM
 c. $H \supset (Q \cdot D)$ 1, Exp
 d. F 2, 3, MT
 e. $(H \cdot Q) \supset F$ 2, Trans
19. 1. $(\sim \sim G \cdot \sim P) \supset T$
 2. $G \supset (T \supset L)$
 3. $\sim G$
- a. $(\sim G \cdot P) \supset T$ 1, DN
 b. $\sim G \supset (\sim P \supset T)$ 1, Exp
 c. $(G \supset T) \supset L$ 2, Assoc
 d. $\sim (\sim G \vee P) \supset T$ 1, DM
 e. $\sim (T \supset L)$ 2, 3, MT

Test 7

20. 1. $\sim N \supset I$

2. $\sim I$

3. $\sim N \bullet (I \vee \sim R)$

a. $\sim R$

2, 3, DS

b. $(\sim N \bullet I) \vee (\sim N \bullet \sim R)$

3, Dist

c. N

1, 2, MT

d. $\sim N \bullet \sim I$

2, 3, Conj

e. I

1, 3, MP

II. Use natural deduction to derive the conclusion in problems 21–25. Use an ordinary proof (not conditional or indirect proof) for problems 21–23.

21. 1. $(A \bullet B) \supset (C \bullet D)$

2. $A \bullet E$

3. $(A \vee E) \supset \sim(C \bullet E) / \sim B$

22. 1. $(S \bullet K) \supset R$

2. $(K \bullet R) \supset N$

3. $(P \supset K) \bullet (\sim K \supset P) / S \supset N$

23. 1. $(H \vee G) \supset (Q \vee \sim P)$

2. $(S \vee D) \supset (R \bullet \sim Q)$

3. $(S \bullet H) \vee (G \bullet S) / \sim P$

Use conditional proof for problem 24.

24. 1. $(D \vee K) \supset (\sim A \vee B)$

2. $(M \vee E) \supset (\sim B \vee C) / (D \bullet E) \supset (C \vee \sim A)$

Use indirect proof for problem 25.

25. 1. $(K \vee L) \supset (M \bullet G)$

2. $M \supset (S \vee \sim K)$

3. $(H \vee G) \supset (G \supset \sim S) / \sim K$

Use natural deduction to prove the following logical truth.

26. $[P \supset (Q \vee R)] \supset [\sim R \supset (P \supset Q)]$

Chapter 8 Test

(The questions in Part I are worth 2 points each,
and the questions in Parts II and III are worth 10 points each.)

I. Select the correct translation for the statements in questions 1–20.

1. If Nathan is hired, then both Anita and Conrad will be relieved.

- a. $(\exists x)(Nx \cdot Hx) \supset [(\exists x)(Ax \cdot Rx) \cdot (\exists x)(Cx \cdot Rx)]$
- b. $Nh \supset (Ar \cdot Cr)$
- c. $(x)[Nx \supset (Ax \cdot Rx)]$
- d. $(\exists x)Nx \supset (\exists x)(Ax \cdot Cx)$
- e. $Hn \supset (Ra \cdot Rc)$

2. A chimpanzee is a primate.

- a. $(x)(Cx \supset Px)$
- b. $(\exists x)(Cx \cdot Px)$
- c. $(x)(Cx \cdot Px)$
- d. $(\exists x)(Cx \supset Px)$
- e. $(\exists x)Cx \supset (\exists x)Px$

3. There is a carousel in the park.

- a. $(x)(Cx \supset Px)$
- b. $(x)(Px \supset Cx)$
- c. $(\exists x)(Cx \cdot Px)$
- d. $(\exists x)Xcp$
- e. $(\exists x)Cx \cdot (\exists x)Px$

4. Not a single child screamed.

- a. $(x)Cx \supset (\exists x)\sim Sx$
- b. $\sim(x)(Cx \supset Sx)$
- c. $(\exists x)(Cx \cdot \sim Sx)$
- d. $(x)(Cx \supset \sim Sx)$
- e. $Cx \supset \sim Sx$

5. Not every old wine turns to vinegar.

- a. $(x)[(Ox \cdot Wx) \supset \sim Tx]$
- b. $(\exists x)[(Ox \cdot Wx) \cdot \sim Tx]$
- c. $(\exists x)[(Ox \cdot Wx) \supset \sim Tx]$
- d. $(x)(Ox \cdot Wx) \supset (\exists x)\sim Tx$
- e. $(x)[(Ox \vee Wx) \supset \sim Tx]$

6. Every boy and girl received a medal.
 - a. $(x)(Bx \supset Rx) \vee (x)(Gx \supset Rx)$
 - b. $(x)[(Bx \cdot Gx) \supset Rx]$
 - c. $(\exists x)[(Bx \cdot Gx) \cdot Rx]$
 - d. $(x)[(Bx \vee Gx) \supset Rx]$
 - e. $(\exists x)(Bx \cdot Rx) \cdot (\exists x)(Gx \cdot Rx)$
7. Rita will be content only if every student graduates.
 - a. $Cr \supset (x)(Sx \supset Gx)$
 - b. $(x)(Sx \supset Gx) \supset Cr$
 - c. $(\exists x)(Sx \cdot Gx) \supset Cr$
 - d. $(x)[(Sx \supset Gx) \supset Cr]$
 - e. $Cr \supset (\exists x)(Sx \cdot Gx)$
8. Only exceptional athletes play on the team.
 - a. $(x)[(Ax \supset Ex) \supset Px]$
 - b. $(x)[(Ex \cdot Ax) \supset Px]$
 - c. $(x)[(Ex \vee Ax) \supset Px]$
 - d. $(\exists x)[(Ex \cdot Ax) \cdot Px]$
 - e. $(x)[Px \supset (Ex \cdot Ax)]$
9. The large sofas are a bargain if they are made of leather.
 - a. $(x)[(Lx \cdot Sx) \supset (Mx \cdot Bx)]$
 - b. $(\exists x)(Lx \cdot Sx) \supset (\exists x)(Mx \cdot Bx)$
 - c. $(x)[(Lx \cdot Sx) \supset (Mx \supset Bx)]$
 - d. $(x)[(Sx \cdot Mx) \supset (Bx \supset Lx)]$
 - e. $(x)(Sx \supset Lx) \supset (\exists x)(Mx \cdot Bx)$
10. If none of the antique porcelains is damaged, then all of the movers will receive a bonus.
 - a. $(x)[(Ax \cdot Px) \supset \sim Dx] \supset (\exists x)(Mx \cdot Rx)$
 - b. $(\exists x)[(Ax \cdot Px) \cdot \sim Dx] \supset (x)(Mx \supset Rx)$
 - c. $(x)\{[(Ax \cdot Px) \supset \sim Dx] \supset (Mx \supset Rx)\}$
 - d. $(x)[Ax \supset (\sim Dx \supset \sim Px)] \supset (x)(Mx \supset Rx)$
 - e. $(x)[(Ax \cdot Px) \supset \sim Dx] \supset (x)(Mx \supset Rx)$

11. Not every patient will recover unless all of the new drugs are effective.
- $\neg(x)(Px \supset \sim Rx) \vee (x)[(Nx \cdot Dx) \supset Ex]$
 - $(\exists x)(Px \cdot \sim Rx) \vee (x)[(Nx \cdot Dx) \supset Ex]$
 - $(\exists x)(Px \cdot \sim Rx) \supset (x)[(Nx \cdot Dx) \supset Ex]$
 - $(x)[(Nx \cdot Dx) \supset Ex] \supset (\exists x)(Px \cdot \sim Rx)$
 - $(x)[(Nx \cdot Dx) \supset Ex] \supset (x)(Px \supset Rx)$
12. If all the architects are careful and exacting, then if none of the buildings implode, they will be rehired.
- $(x)(Bx \supset \sim Ix) \supset (x)\{[Ax \supset (Cx \cdot Ex)] \supset Rx\}$
 - $(x)\{[(Ax \cdot Cx) \supset Ex]\} \supset [(y)(By \supset \sim Iy) \supset Rx]$
 - $(x)[Ax \supset (Cx \cdot Ex)] \supset [(y)(By \supset \sim Iy) \supset Rx]$
 - $(x)\{[Ax \supset (Cx \cdot Ex)] \supset [(y)(By \supset \sim Iy) \supset Rx]\}$
 - $(x)\{[Ax \supset (Cx \cdot Ex)] \supset [(x)(By \supset \sim Iy) \supset Rx]\}$
13. Every teenager admires someone or other.
- $(x)[Tx \supset (\exists y)(Py \cdot Axy)]$
 - $(x)[Tx \supset (y)(Py \supset Axy)]$
 - $(x)(\exists y)[(Py \cdot Axy) \supset Tx]$
 - $(\exists x)[Tx \cdot (y)(Py \supset Axy)]$
 - $(x)Tx \supset (\exists y)(Py \cdot Axy)$
14. Whoever writes sonatas is a composer.
- $(\exists x)\{Px \cdot [(y)(Sy \cdot Wxy) \supset Cx]\}$
 - $(x)[Px \cdot (\exists y)(Sy \cdot Wxy)] \supset Cx$
 - $(x)\{[Px \cdot (\exists y)(Sy \cdot Wxy)] \supset Cx\}$
 - $(x)\{Px \cdot [(\exists y)(Sy \cdot Wxy) \supset Cx]\}$
 - $(x)\{[Px \cdot (y)(Sy \cdot Wxy)] \supset Cx\}$
15. A few cooks can prepare every item on the menu.
- $(\exists x)Cx \cdot (y)[(Iy \cdot My) \supset Pxy]$
 - $(\exists x)\{Cx \cdot (\exists y)[(Iy \cdot My) \cdot Pxy]\}$
 - $(x)\{Cx \supset (y)[(Iy \cdot My) \supset Pxy]\}$
 - $(\exists x)\{Cx \cdot (y)[(Iy \cdot My) \supset Pxy]\}$
 - $(x)\{Cx \supset (\exists y)[(Iy \cdot My) \cdot Pxy]\}$

16. If Claire hires Marty, then if Marty accomplishes every task he is given, then Claire will be pleased.

- a. $Hcm \supset \{(\exists x)[(Tx \cdot Gxm) \cdot Amx] \supset Pc\}$
- b. $Chm \supset \{(x)[(Tx \cdot Mgx) \supset Max] \supset Cp\}$
- c. $Hcm \supset \{(x)[(Tx \cdot Gxm) \supset Amx] \supset Pc\}$
- d. $Hcm \supset (x)[(Tx \cdot Gxm) \supset Amx] \supset Pc$
- e. $Hcm \supset [(x)(Gxm) \supset Amx] \supset Pc$

17. The president of the Omega Corporation is not Riley.

- a. $(\exists x)[Pxo \cdot (\exists y)(Pyo \cdot y = x) \cdot \sim Pro]$
- b. $(\exists x)[Pxo \cdot (y)(Pyo \supset y = x) \cdot \sim Pro]$
- c. $(x)[Pxo \cdot (y)(Pyo \supset y = x)] \supset \sim Pro$
- d. $(x)[Pxo \cdot (\exists y)(Pyo \cdot y = x)] \supset \sim Pro$
- e. $(\exists x)[Pxo \cdot (y)(y = x \supset Pyo) \cdot \sim Pro]$

18. Noelle is the brightest student in the class.

- a. $(x)[(Sx \cdot Cx \cdot x \neq n) \supset Bnx]$
- b. $Sn \cdot Cn \cdot (x)[(Sx \cdot Cx \cdot x = n) \supset Bnx]$
- c. $Sn \cdot Cn \cdot (x)[(Sx \cdot Cx) \supset Bxn]$
- d. $Sn \cdot Cn \cdot (\exists x)(Sx \cdot Cx \cdot x \neq n \cdot Bnx)$
- e. $Sn \cdot Cn \cdot (x)[(Sx \cdot Cx \cdot x \neq n) \supset Bnx]$

19. There is at most one genius on the faculty.

- a. $(\exists x)(Gx \cdot Fx)$
- b. $(x)(y)[(Gx \cdot Fx \cdot Gy \cdot Fy) \supset x = y]$
- c. $(x)(y)[(Gx \cdot Fx \cdot Gy \cdot Fy) \supset x \neq y]$
- d. $(\exists x)(\exists y)(Gx \cdot Fx \cdot Gy \cdot Fy \cdot x \neq y)$
- e. $(\exists x)\{Gx \cdot Fx \cdot (y)[(Gy \cdot Fy) \supset x = y]\}$

20. Only Michael earned an A on the calculus test.

- a. $Em \cdot (x)(Ex \supset x = m)$
- b. $Em \cdot (x)(Ex \supset x \neq m)$
- c. $(x)(Ex \supset x = m)$
- d. $Em \cdot (\exists x)(Ex \cdot x \neq m)$
- e. $Em \cdot (\exists x)(Ex \cdot x = m)$

II. Use natural deduction to derive the conclusion of the arguments in questions 21–25. Use conditional proof or indirect proof as needed.

21. 1. $(x)[(Sx \bullet Tx) \supset (Gx \supset Hx)]$
 2. $(x)[Sx \supset (Tx \bullet \sim Hx)] / (x)(Sx \supset \sim Gs)$
22. 1. $(\exists x)(Nx \vee Rx) \supset (x)[\sim Kx \supset (Ex \vee \sim Nx)]$
 2. $(\exists x)(Nx \bullet \sim Kx) / (\exists x)Ex$
23. 1. $\sim(\exists x)(Ax \bullet \sim Bx)$
 2. $(x)[Bx \supset (Cx \bullet Dx)] / \sim(\exists x)(Ax \bullet \sim Dx)$
24. 1. $(x)(\exists y)[(Fx \vee Gy) \supset (Pxy \vee Qxy)]$
 2. $(\exists x)(y)(Fx \bullet \sim Qxy) / (\exists x)(\exists y)Pxy$
25. 1. $(x)[(Jx \vee Kx) \supset x = a]$
 2. $(\exists x)(Jx \bullet x = c) / a = c$

III. Use the finite universe method to prove the following argument invalid.

26. 1. $(x)[Ex \supset (Nx \vee Px)]$
 2. $(\exists x)(Ex \bullet \sim Px) / (x)Nx$

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Test Answers

Chapter 1

1-d, 2-c, 3-a, 4-c, 5-d, 6-b, 7-c, 8-e, 9-b, 10-a, 11-e, 12-d, 13-b, 14-a, 15-c, 16-e, 17-d, 18-d, 19-c, 20-a, 21-b, 22-e, 23-c, 24-b, 25-a, 26-e, 27-b, 28-c, 29-d, 30-a, 31-b, 32-e, 33-b, 34-c, 35-c, 36-e, 37-a, 38-b, 39-d, 40-c, 41-e, 42-b, 43-a, 44-d, 45-c, 46-e, 47-e, 48-b, 49-d, 50-a.

Chapter 2

1-c, 2-a, 3-d, 4-e, 5-b, 6-d, 7-a, 8-c, 9-e, 10-b, 11-c, 12-b, 13-a, 14-e, 15-d, 16-d, 17-c, 18-b, 19-a, 20-e, 21-e, 22-d, 23-c, 24-a, 25-b, 26-d, 27-e, 28-b, 29-a, 30-d, 31-c, 32-a, 33-e, 34-b, 35-c, 36-a, 37-c, 38-c, 39-d, 40-e.

Chapter 3

1-d, 2-a, 3-b, 4-e, 5-c, 6-b, 7-a, 8-d, 9-b, 10-c, 11-e, 12-c, 13-a, 14-d, 15-b, 16-c, 17-d, 18-a, 19-e, 20-a, 21-c, 22-b, 23-d, 24-c, 25-e, 26-a, 27-e, 28-b, 29-c, 30-d, 31-a, 32-b, 33-a, 34-e, 35-d, 36-c, 37-b, 38-d, 39-b, 40-e.

Chapter 4

1-a, 2-d, 3-c, 4-e, 5-b, 6-c, 7-a, 8-b, 9-e, 10-d, 11-b, 12-c, 13-a, 14-d, 15-e, 16-d, 17-c, 18-b, 19-e, 20-a, 21-b, 22-c, 23-d, 24-b, 25-e, 26-a, 27-c, 28-d, 29-e, 30-b, 31-e, 32-c, 33-d, 34-a, 35-b, 36-c, 37-e, 38-c, 39-d, 40-e, 41-a, 42-b, 43-e, 44-c, 45-d, 46-a, 47-b, 48-c, 49-e, 50-d.

Chapter 5

1-d, 2-a, 3-e, 4-c, 5-b, 6-c, 7-a, 8-d, 9-e, 10-b, 11-d, 12-c, 13-a, 14-e, 15-c, 16-b, 17-c, 18-a, 19-b, 20-c, 21-e, 22-a, 23-d, 24-e, 25-b, 26-e, 27-c, 28-b, 29-d, 30-a, 31-b, 32-c, 33-a, 34-d, 35-d, 36-e, 37-e, 38-c, 39-b, 40-a.

Chapter 6

1-d, 2-a, 3-c, 4-b, 5-e, 6-b, 7-c, 8-e, 9-a, 10-b, 11-b, 12-d, 13-a, 14-c, 15-e, 16-c, 17-a, 18-e, 19-c, 20-d, 21-d, 22-e, 23-e, 24-c, 25-c, 26-b, 27-b, 28-a, 29-a, 30-b, 31-b, 32-e, 33-e, 34-c, 35-c, 36-a, 37-e, 38-c, 39-b, 40-a, 41-d, 42-c, 43-d, 44-e, 45-b, 46-a, 47-c, 48-c, 49-b, 50-e.

Chapter 7

1-d, 2-a, 3-c, 4-b, 5-e, 6-c, 7-a, 8-d, 9-e, 10-b, 11-d, 12-e, 13-c, 14-b, 15-a, 16-c, 17-a, 18-e, 19-d, 20-b

Chapter 8

1-e, 2-a, 3-c, 4-d, 5-b, 6-d, 7-a, 8-e, 9-c, 10-e, 11-b, 12-d, 13-a, 14-c, 15-d, 16-c, 17-b, 18-e, 19-b, 20-a

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