

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DOCTOR OF PHILOSOPHY

PHIL 923: FORMAL LOGIC

STREAMS:

TIME: 3 HOURS

DAY/DATE: TUESDAY 06/04/2021

8.30 A.M. – 11.30 A.M.

INSTRUCTIONS: ANSWER QUESTIONS ONE AND ANY OTHER TWO

1. Analyze each of the following arguments and answer: **Is the argument factually correct, is the argument valid, is the argument sound.** Your answer may only contain three words for each argument.

1. All dogs are reptiles
All reptiles are Martians
Therefore, all dogs are Martians

2. Some dogs are cats
All cats are felines
Therefore, some dogs are felines

3. All dogs are Republicans
Some dogs are flea-bags
Therefore, some Republicans are flea-bags

4. All dogs are Republicans
Some Republicans are flea-bags

Therefore, some dogs are flea-bags

5. Some cats are pets

Some pets are dogs

Therefore, some cats are dogs

6. All cats are mammals

All dogs are mammals

Therefore, all cats are dogs

7. All lizards are reptiles

No reptiles are warm-blooded

No lizards are warm-blooded

8. All dogs are reptiles

No reptiles are warm-blooded

Therefore, no dogs are warm-blooded

9. No cats are dogs

No dogs are cows

Therefore, no cats are cows

10. No cats are dogs

Some dogs are pets

Therefore, some pets are not cats

2. Translate each of the following statements into the language of sentential logic. Use the suggested abbreviations (capitalized words), if provided; otherwise, devise an abbreviation scheme of your own. In each case, write down what atomic statement each letter stands for, making sure it is a complete sentence. Letters should stand for positively stated sentences, not negatively stated ones; for example, the negative sentence 'I am not hungry' should be symbolized as ' $\sim H$ ' using 'H' to stand for 'I am hungry'.

a) It is DINNER time, but I am not HUNGRY.

- b) Although I am TIRED, I am not QUITTING.
- c) Jay and Kay are roommates, but they hate one another.
- d) Jay and Kay are Republicans, but they both hate Nixon.
- e) KEEP trying, and the answer will APPEAR.
- f) GIVE him an inch, and he will TAKE a mile.
- g) Either I am CRAZY or I just SAW a flying saucer.
- h) Either Jones is a FOOL or he is DISHONEST.
- i) JAY and KAY won't both be present at graduation.
- j) JAY will win, or KAY will win, but not both.

3. Name and explain how the following symbols are used in Formal Logic. Give an example (statement) on how each is used.

a) $\Rightarrow/\rightarrow/\supset$

b) $\Leftrightarrow/\equiv/\leftrightarrow$

c) $\neg/\sim/!$

d) $\wedge/\cdot/\&$

e) $\vee/+/\parallel$

f) $\oplus/\underline{\vee}$

g) $\top/T/1$

i) \exists

j) $\exists!$

k) $:=/\equiv/:\Leftrightarrow$

4. Using the suggested abbreviations (the capitalized words), translate each of the following into the language of predicate logic.

- i. Every AMBITIOUS STUDENT is CLEVER.
- ii. Every STUDENT is both CLEVER and AMBITIOUS.
- iii. Every STUDENT is either CLEVER or not AMBITIOUS.
- iv. Every STUDENT who is AMBITIOUS is CLEVER.
- v. Every STUDENT who is CLEVER is AMBITIOUS.

- vi. Some CLEVER STUDENTS are AMBITIOUS.
 - vii. Some CLEVER STUDENTS are not AMBITIOUS.
 - viii. Some AMBITIOUS STUDENTS are not CLEVER.
 - ix. No AMBITIOUS STUDENT is CLEVER.
 - x. No CLEVER STUDENT is AMBITIOUS.
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