



# MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF HUMANTIES AND SOCIAL SCIENCES

DEPARTMENT OF SOCIAL SCIENCES

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF ARTS

APH 200: INTRODUCTION TO SYMBOLIC LOGIC

DATE: 9/12/2021

TIME: 11:00 – 1:00 PM

---

## INSTRUCTIONS:

Answer Question One and Any Other Two Questions.

### QUESTION ONE (COMPULSORY) (30 MARKS)

Explain the following:

- What is the rationale of symbolic logic? (5 marks)
- List the five logical operators, their names, their logical function and translations.(15 marks)
- Using any type of variables, provide the five truth tables for the types of compounds. (10 marks)

### QUESTION TWO (20 MARKS)

- What is the main idea of truth tables? (4 marks)
- Construct truth tables to determine whether the following arguments are valid or invalid
  - $(A \vee C). \sim A / \therefore C$
  - $Q. (P \bullet R). (P \bullet R) \supset Q / \therefore \sim P$
  - $(P \vee Q). (Q \bullet R). \sim (Q \bullet R) / \therefore P$
  - $[(C \supset B). (\sim B \bullet D)] / \therefore C$  (16 marks)

### QUESTION THREE (20 MARKS)

- a) What is the rationale of the short truth table? (4 marks)
- b) Use any version of the abbreviated truth tables to determine validity and invalidity of the following arguments (16 marks)
- i.  $(P \vee Q), \sim Q / \therefore \sim P$
  - ii.  $P \supset (Q \supset R), P \supset Q / \therefore R$
  - iii.  $P \bullet (\sim Q \supset \sim P), (R \supset \sim Q) / \therefore \sim R$
  - iv.  $\sim F \vee (G \bullet H), (P \supset F) / \therefore (\sim H \supset \sim P)$

### QUESTION FOUR (20 MARKS)

- a) What is the rationale of the truth tree method? (4 marks)
- b) Determine using truth tree method whether the following symbolic arguments are valid? (16 marks)
- i.
    1.  $C \supset A$
    2.  $A \supset B \bullet D$
    3.  $C / \therefore B$
  - ii.
    1.  $(A \supset B)$
    2.  $(C \supset D)$
    3.  $(B \vee C) / \therefore A \vee D$

### QUESTION FIVE (20 MARKS)

- a) Illustrate the truth tree rules for the five logical operators. (5 marks)
- b) Determine using truth tree method whether the following symbolic arguments are valid? (16 marks)
- a)
    1.  $F \supset (G \supset H)$
    2.  $/ \therefore (\sim H \bullet K) \supset (G \supset \sim F)$
  - b) $(H \bullet K) \supset L$

H/ .:KDL