MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES

DEPARTMENT OF SOCIAL SCIENCES

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF ARTS

APH 200: SYMBOLIC LOGIC

DATE: 28/11/2019 **TIME: 2.00-4.00 PM**

INSTRUCTIONS: Answer QUESTION ONE and any other TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) Highlight difference between syllogistic logic and symbolic logic? (10 marks)

b) Explain the advantages of natural deduction over truth table method. (5 marks)

c) Discuss the rationale of truth table method, short truth table method and the truth tree method? (15 marks)

d) Demonstrate the rationale of predicate logic (5 marks)

QUESTION TWO (20 MARKS)

Construct truth tables or the abbreviated truth tables to determine whether the following arguments are valid

1. A. / ∴ [(A∨ B) • (~A • B)]
2. (D⊃ H). (¬ D ⊃ ¬ E). (¬H ⊃ ¬ E). / ∴¬ H
3. [J ⊃ (¬ G ⊃ F•R)]. ¬ (¬ G ⊃ F•R). / ∴¬ J.
4. S ⊃ (T ∨ C). (¬T ∨ ¬ C). / ∴¬ S
5. (R ⊃ W). (W ⊃ C) / ∴ (R • C)

QUESTION THREE (20 MARKS)

Determine using truth tree method whether the following symbolic arguments are valid?

a) A. / ∴ [(A∨ B) • (~A • B)]

b) (D⊃ H). (¬ D ⊃ ¬ E). (¬H ⊃ ¬ E). / ∴¬ H

c) [J ⊃ (¬ G ⊃ F•R)]. ¬ (¬ G ⊃ F•R). / ∴¬ J.

d) S ⊃ (T ∨ C). (¬T ∨ ¬ C). / ∴¬ S

e) (R ⊃ W). (W ⊃ C) / ∴ (R • C)

QUESTION FOUR (20 MARKS)

a) Explain the meaning of the following terms. (6 marks)

i. The Direct Proof

ii. Conditional Proof

iii. Indirect proof

b) Identify which of the group of rules was used to derive the last line. (6 marks)

i.

1. P ⊃ (Q • R)
2. (Q • R) ⊃ (S∨ T)
3. P ⊃ (S ∨ T)

ii.

1. (Q ⊃ T) ⊃ S
2. ~S ∨ ~P
3. R ⊃ P
4. ~ (Q ⊃T) ∨ ~R

iii.

1. (M ∨ R) • P
2. ~S ⊃ ~P
3. S ⊃ ~M / ∴ R

c) Use the rule of conditional proof to construct deductions for each of the following (8 marks)

i.

1. P ∨ (Q•R)

2. $T \supset \sim(P \vee U)$
3. $S \supset (Q \supset R) / \therefore \sim S \vee \sim T$

ii.

1. $(P \bullet Q) \vee R$
2. $\sim R \vee Q / \therefore P \supset Q$

c). $(\sim N \vee E) \supset \sim S / \therefore \sim N \supset \sim S$

a. $W \equiv (L \vee F)$

QUESTION FIVE (20 MARKS)

a) Explain the meaning of predicate logic? (5 marks)

b) Outline the basic concepts in predicate logic. (10 marks)

c) State the four quantifier rules (5 marks)