



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND/THIRD YEAR SPECIAL/SUPPLEMENTARY EXAMINATION

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

BACHELOR OF SCIENCE IN ELECTRICAL AND ELECTRONIC ENGINEERING

EMM308/ EEE202: PROGRAMMING II: SUPPLEMENTARY

DATE:

TIME:

INSTRUCTIONS

Attempt Question ONE and ANY other TWO

QUESTION ONE

- a) List the main FIVE goals (reasons) for studying the formal semantics of programming languages [5 marks]
- b) Using an example, explain how *sub routines* implement *flow of control* in programming language. [4 marks]
- c) Discuss the following criteria used to determine the quality of programming language. [6 marks]
 - i) Extensibility
 - ii) Standardability
 - iii) Implementability
- d) List any FIVE Primary Reasons for Good Programming Language Design [5 marks]

QUESTION TWO

- a) Object-oriented programming is one of the programming language that is in wide use today. Explain the following terms as used in Object Oriented programming [10 marks]
 - i) Polymorphism
 - ii) Abstraction
 - iii) Message passing
 - iv) Encapsulation
 - v) Class

- b) Explain the principle of functional languages. Give two examples of functional languages. [5 marks]
- c) Discuss the key principles of object-oriented programming paradigm. [5 marks]

QUESTION THREE

- a) Explain the concept *Orthogonality* of a programming language. Give three ways in which a language may fail to achieve *Orthogonality* characteristic. [6 marks]
- b) List and explain the TWO types of semantics in programming [4 marks]
- c) List and explain the three major classes to formal semantics as used in programming languages [6 marks]
- d) Using examples differentiate between *concrete syntax* and *abstract syntax*. [4 marks]

QUESTION FOUR

- a) Discuss the following variations of formal semantics as applied in many programming languages [8 marks]
 - i) Action semantics
 - ii) Predicate transformer semantics
 - iii) Algebraic semantics
 - iv) Concurrency semantics
- b) To manage the size of program code in many programming languages, control structures are mandatory. List and Explain the three control structures [6 marks]
- c) In context of *data integrity* and *flexibility*, compare and contrast *typed* and *untyped languages*. Give example language in each category. [6 marks]

QUESTION FIVE

- a. Explain the following types of data structures as its applied in many programming languages [10 marks]
 - i. Array
 - ii. Union

- iii. Graphs
 - iv. Structures
 - v. Set
- d) In context of type systems, explain the following concepts. Use examples programming languages **[6mark]**
- i. Type loopholes
 - ii. Latent typing
 - iii. Type-inferred
- e) List any FOUR programming Language Evaluation Criteria when choosing the language to use in program development **[4 marks]**