

UNIVERSITY EXAMINATIONS

1ST SEMESTER 2022/2023 ACADEMIC YEAR

**THIRD YEAR EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE (COMPUTER SCIENCE)**

COMP 311: COMPILER CONSTRUCTION AND DESIGN

STREAM: R

TIME: 2 HRS

DAY: TUESDAY [8.30PM – 10.30PM]

DATE: 13/12/2022

THIS QUESTION PAPER CONSISTS OF THREE (3) PAGES

PLEASE DO NOT OPEN UNTIL THE INVIGILATOR SAYS SO.

INSTRUCTIONS: Answer Question 1 and Any Other Two.**QUESTION ONE: (30 MARKS)**

- (a) Explain the various compiler construction tools. (2 marks)
- (b) Define token, pattern and lexeme with suitable example. How input buffering can be implemented for scanner, Explain. (6 Marks)
- (c) Explain the role of the parser. Write an algorithm for non-recursive predictive parsing. (4 Marks)
- (d) Using a diagram, discuss the Language Processing System in a compiler design. (6 Marks)
- (e) Explain the two divisions of phases based on the way they compile. (6 Marks)
- (f) Explain the phase of a compiler with block diagram. (6 Marks)

QUESTION TWO: (20 MARKS)

- (a) Discuss the role of semantic analysis in compiler design and construction. (5 Marks)
- (b) Discuss the role of the run-time environment phase in compiler design and construction. (5 Marks)
- (c) Discuss the phases of a compiler in compiler design. (10 Marks)

QUESTION THREE: (20 MARKS)

- a) Discuss the role of Lexical Analysis phase in compiler design and construction. (6 Marks)
- b) Discuss the role of regular expressions in compiler design and construction. (7 Marks)
- c) Discuss the role of finite automata in compiler design and construction. (7 Marks)

QUESTION FOUR: (20 MARKS)

- (a) Discuss the role of syntax analysis in compiler design and construction in relation to the following: (12 marks)

- (i) Context-Free Grammar .
 - (ii) Syntax Analyzers
 - (iii) Derivation
 - (iv) Parse Tree
 - (v) Ambiguity
 - (vi) Precedence and Associativity
- (b) Discuss the four error recovery strategies in compiler design and construction.
- (8 Marks)

QUESTION FIVE: (20 MARKS)

- (a) Discuss the two types of parsing in compiler design and construction. (6 Marks)
- (b) Discuss the role of symbol table in compiler design and construction. (7 Marks)
- (c) Discuss the role intermediate code generation in compiler design and construction. (7 marks)