



(Knowledge for Development)
KIBABII UNIVERSITY

**UNIVERSITY EXAMINATIONS
2021 / 2022 ACADEMIC YEAR**

**SPECIAL / SUPPLEMENTARY EXAMINATIONS
YEAR THREE SEMESTER ONE EXAMINATIONS**

**FOR THE DEGREE OF BACHELOR OF SCIENCE
COMPUTER SCIENCE**

COURSE CODE : CSC 310

**COURSE TITLE : COMPILER CONSTRUCTION
AND DESIGN**

DATE: 16 / 11 / 2022

TIME: 11:00 A.M – 01:00 P.M

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTIONS ONE AND ANY OTHER TWO.

QUESTION ONE (COMPULSORY) [30 MARKS]

- a) Describe the input and output of intermediate code generator. [3 Marks]
- b) True or false? Are the following regular expressions exactly equivalent? The special symbol ϵ represents the empty string. [5 Marks]

- a) $x?.x^*$ x^*
- b) $y^*|z^*$ $(y|z)^*$
- c) a^*b^* $(ab)^*$
- d) $(P|Q|\epsilon)^*$ $(P|Q)^*$
- e) $(0|1)?$ $0?|1?$

- c) Describe the advantages of using an intermediate language [6 Marks]
- d) Describe top-down parsing [6 Marks]
- e) Describe left factoring. [4 Marks]
- f) Describe different kinds of errors encountered during compilation [6 Marks]

QUESTION TWO [20 MARKS]

- a) Describe 3 address code as known in compiler design. [5 Marks]
- b) Draw the syntax tree for the following: [6 Marks]
- I. $a+b*(c*a)-(c/a)$
- II. If $a < b$ then $c = b$ else $c = a$
- III. $a-b*a+c$ [4 Marks]
- c) Describe the role and need of error handler
- d) Describe context free grammar (CFG) and show how identifiers, numbers with decimal numbers and numbers with exponent can be represented using CFG [5 Marks]

QUESTION THREE [20 MARKS]

- a) Using relevant examples describe what is ambiguity. Show how its solved [6 Marks]
- b) Describe backtracking as applied in compiler design. [4Marks]
- c) Describe the algorithm for calculation of follow set. [5 Marks]
- d) With clarity distinguish between code optimization and code generation [5 Marks]

QUESTION FOUR [20 MARKS]

- a) Describe loop optimization [4 Marks]
- b) Describe reduction and strength in code optimization. [6 Marks]
- c) Describe the advantage of directed acyclic graphs [5 Marks]
- d) Describe the limitation of syntax analyzer. [5 Marks]

QUESTION FIVE [20 MARKS]

- a) With the aid of a diagram well labelled explain all phases of compiler starting from source code to target code [10 Marks]
- b) Describe the NDF automaton [4 Marks]
- c) Describe top down parsing [6 Marks]