UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE, BACHELOR OF SCIENCE (COMPUTER SCIENCE)

CSC 326: COMPUTER CONSTRUCTION

DATE: APRIL 5, 2018 **TIME: 2:00 PM – 4:00 PM**

INSTRUCTIONS:

Answer Question ONE and ANY other two Questions

QUESTION ONE (30 MARKS)

a) Describe the TWO parts of a compiler. (2 marks)

b) Briefly describe Bootstrapping technique. (2 marks)

c) Describe the stage of a TWO PASS compiler where **object code generation** is done. (2 marks)

d) Differentiate the following terms as used in compilers. (3 marks)

i) Tokens.

ii) Patterns.

iii) Lexeme.

e) Describe in details the components of a Context-free Grammar. (4 marks)

f) Draw the structure of a compiler and name all its phases. (4 marks)

g) Construct a top-down parser from the given Grammar and input string. (4 marks)

Input: id+id+id.
Grammar:
$E \rightarrow TE'$
$E' \rightarrow +TE' \mid \lambda$
$T \rightarrow FT'$

$T' \rightarrow *FT' \mid \lambda$
$F \rightarrow (E) \mid id$

h) Mention and explain FOUR different classification of errors in compilation process. (4 marks)

i) Describe the applications of compiler technology. (5 marks)

QUESTION TWO (20 MARKS)

a) Describe the various error recovery strategies for a lexical analysis. (4 marks)

b) Draw a transition Diagram for relational operators. (6 marks)

a) Explain the TWO main types of parsers. (10 marks)

QUESTION THREE (20 MARKS)

a) Describe four principal uses of registers in Code Generation. (4 marks)

b) Discuss the issues in design of a code generator. (8 marks)

c) Write a detailed notes on the following:

i) Peephole optimization. (4 marks)

ii) Basic Blocks. (4 marks)

QUESTION FOUR (20 MARKS)

a) Explain the importance of code optimization part in compilers. (4 marks)

b) Discuss the intermediate code generation procedures. (7 marks)

c) Describe the various methods of implementing three address statements. (9 marks)

QUESTION FIVE (20 MARKS)

b) Describe the benefits of intermediate code generation in compiler design. (5 marks)

c) Draw a DFA for the following regular expression: ***a(a/b)*abb.*** (7 marks)

d) Generate the three address code for the following program: (8 marks)

```
while (i<10)
    {
    x := 0;
    i := i + 1;
    }
```

--END--