NATIONAL OPEN UNIVERSITY OF NIGERIA
14-16 AHMADU BELLO WAY, VICTORIA ISLAND LAGOS
SCHOOL OF SCIENCE AND TECHNOLOGY
MAY/JUNE 2012 EXAMINATION

CIT 445 Principles & Techniques of Compilers
Time Allowed: 2½ hrs

Instruction: Answer any five (5) questions

1a) Define formal Grammar.) 4 marks
b) List and define the four basic types of grammars in the field of Computer Science) 8 marks
c) Given the grammar *G* with following production rules, S → a | aS | bS, determine whether the string *bbaaba* can be generated by the grammar) 2marks

2a) Define formal language) 3 marks
b) State three of the uses of formal languages) 3 marks
c) What is a translator?) 2marks
d) Why do we need a translator?) 3 marks
e) Enumerate the functions performed by the lexical analyser) 4 marks

3a) Compare interpreter and compiler) 5 marks
b) State any five qualities of a compiler) 5 marks
c) State the knowledge needed to build a compiler) 4 marks

4) With the aid of illustrative diagram describe the phases of a compiler.) 14 marks

5) Consider the grammar G below:

G: E → E + T / T
T → T * F / F
F → (E) / i

a) Generate the non-left recursive version of the grammar) 5 marks
b) Find FOLLOW of all the nonterminal symbols in the non-left recursive version of the grammar) 9 marks

6a) What are the benefits of LR parsing?) 5 marks

b) List the common techniques for building tables for an “LR” parser stating the characteristics of each?) 6 marks

c) Consider the grammar,

G: $E \rightarrow E + T \mid T$
$T \rightarrow T*F \mid F$
$F \rightarrow (E) \mid i$

What is the augmented grammar for this grammar.) 4 marks

7) Consider the grammar,

G: $S \rightarrow a \mid aS \mid bS$

a) Find the LR(0) items for this grammar) 10 marks
b) Construct an NFA whose states are the LR(0) items from (a).)4 marks