COURSE CODE: CIT445
COURSE TITLE: PRINCIPLES AND TECHNIQUES OF COMPILERS
CREDIT: 3 UNITS
TIME ALLOWED: 2½ HOURS
INSTRUCTION: ANSWER QUESTION 1 AND ANY OTHER FOUR (4) QUESTIONS

1a) Explain what is meant by top-down parsing technique *(2 marks)*

 b) State the difficulties in top-down parsing   *(6 marks)*

c) Analyse the errors which can be detected during lexical analysis. *(6 marks)*

d) What is meant by the "front end" of a compiler? *(2 marks)*

e) List the phases that constitute the front end of a compiler. *(4 marks)*

f) State two (2) of the uses of formal languages *(2 mark)*

2a)) With the aid of a suitable diagram, clearly state the use of T-diagrams *(4 marks)*

b) Discuss any five (5) qualities of compilers *(5 marks)*

c) How are the following represented?

          i) Grammar symbols   *(1 mark)*

          ii) strings of terminals *(1 mark)*

          iii) productions   *(1 mark)*

3a)) List the steps to implement Lex. *(5 marks)*

b) Explain the process of creating a lexical processor with Lex *(4 marks)*

c) Identify any three (3) roles of the Parser   *(3 marks)*

4a) State the constituents of a Context-Free Grammar (CFG) *(4 marks)*

b) State the usefulness of CFGs. (2 *marks)*

c) Write short notes on the following:

          (i) Operator precedence parser   *(2 marks)*

          (ii) operator Grammar   *(2 marks)*

          (iii) operator precedence e Grammar *(2 marks)*

5a) Express the operator precedence parser algorithm. *(9 marks)*

b) Briefly describe a "parser". *(3 marks)*

6a) Suppose we have a grammar G:

E → E + T
E → T
T → T*F
T → F
F → (E)
F → a

i) Find the left parse of the sentence a *(a + a) stating the production rule applied at each stage. (8¼ *mark*)

ii) State the sequence of derivation. (*¼ mark*)

b) Write short notes on Bottom-up Parsing. (*3½ marks*)