



# **MAASAI MARA UNIVERSITY**

**UNIVERSITY EXAMINATIONS 2024/2025  
ACADEMIC YEAR**

**YEAR THREE SEMESTER TWO**

**SCHOOL OF PURE APPLIED AND HEALTH  
SCIENCES**

**FOR THE BACHELOR OF SCIENCE IN  
COMPUTER SCIENCE/INFORMATION  
SCIENCE/B.ED**

**COURSE CODE: COM 3230**

**COURSE TITLE: COMPILER DESIGN**

**DATE: 27/5/24**

**TIME: 0230-0430HRS**

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**INSTRUCTIONS TO CANDIDATES**

- ANSWER Question **ONE** and any other **TWO**

### **QUESTION ONE [20 MARKS]**

- a. Define the following terms as used in Compiler design
- i. Sentence
  - ii. Language
  - iii. Grammar
  - iv. Parsing
- [4 Marks]**
- b. Discuss the importance of a symbol table in the compilation processes, highlighting its use particularly in semantic analysis.
- [2 Marks]**
- c. Discuss the role of the Parser during the compiling process.
- [4 Marks]**
- d. Compare and Contrast Compiler and an interpreter.
- [4 Marks]**
- e. The following is an example of a source code for a Very Simple Language (VSL) for compilation.
- $$Y=ABX+Q$$
- Find a parse tree for the expression.
- [2 Marks]**
- f. Using an appropriate example, explain the concept of Predictive parsing
- [4 Marks]**

### **QUESTION TWO [15 MARKS]**

- a. It is usually possible to combine scanning and parsing in the program implementation, however where possible it is advisable to separate the two activities. State the main reasons why this is necessary.
- [4 Marks]**
- b. Build up your own grammar and construct a parse tree for the following program Sentence:
- “The choir sang very sweet songs to entertain the congregation”**
- i. Using the Bottom Up procedure, show how the parsing of the sentence would be done.
  - ii. Construct a parse tree for the sentence.
- [6 Marks]**
- [5 Marks]**

### **QUESTION THREE [15 MARKS]**

- a) Briefly describe the significance of a Syntax Directed translation. **[2 Marks]**
- b) Explain the concept of Recursive Descent parsing algorithm mentioning one major advantage and disadvantage. **[5 Marks]**
- c) Discuss the phases of a compiler in detail. **[8 Marks]**

**QUESTION FOUR [15 MARKS]**

- a)
- i. Briefly explain how use of disambiguating rules such as precedence help in resolving ambiguity in grammar. **[2 Marks]**
- ii. An expression like  $7*3 + 5$  can generate more than one parse tree. Construct any two parse trees for the expression. **[4 Marks]**
- iii. Comment on the implications of this scenario during semantic analysis **[1 Marks]**
- b) State and describe any four types of grammar used in the design of Compilers. **[8 Marks]**

**END//**