



Kasarani Campus  
Off Thika Road  
Tel. 2042692 / 3  
P. O. Box 49274, 00100  
NAIROBI  
Westlands Campus  
Pamstech House  
Woodvale Grove  
Tel. 4442212  
Fax: 4444175

**KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY**  
**UNIVERSITY EXAMINATION, 2022/2023 ACADEMIC YEAR**  
**SECOND YEAR, SECOND SEMESTER EXAMINATION**  
**FOR THE BACHELOR OF SCIENCE IN COMPUTER SCIENCE**

**KCS 208 – COMPUTER PROGRAMMING LANGUAGES**

Date: 13<sup>TH</sup> DECEMBER 2022  
Time: 2:30PM – 4:30PM

**INSTRUCTIONS TO CANDIDATES**

**ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS**

**QUESTION ONE (30 MARKS)**

- a) Differentiate between the following terms as used in computer programming languages
- i) Compiler and an interpreter (2 Marks)
  - ii) AWT and Swing (2 Marks)
  - iii) JDK and JVM (2 Marks)
  - iv) Source code and Byte code (2 Marks)
- b) Enumerate any four roles of a lexical analyzer (4 Marks)
- c) Distinguish between compilation and interpretation (4 Marks)
- d) Give the reasons for optimizing the code (2 Marks)
- e) Distinguish between Input() and print() function in python (2 Marks)
- f) Differentiate between low level and high level programming languages (4 Marks)
- g) Perform a lexical analysis on the following program and count the number of valid tokens
- ```
1.int main()
2.{
3. int a = 10, b = 20;
4. printf("sum is :%d",a+b);
5. return 0;
6.}
```

(6 Marks)

**QUESTION TWO (20 MARKS)**

- a) Describe the following structure and analysis commonality features of computer programming languages (8 Marks)
- i) Syntactic
  - ii) Lexical
  - iii) Pragmatic
  - iv) Semantic
- b) Describe the symbol table and states its roles (2 Marks)
- c) Prolog is a logical and a declarative programming language. Discuss the applications of Prolog (5 Marks)

- d) Consider the following information given by consumers surveying bureau of Kenya:

An ES has the following facts and rules.

IF one has at least 1 million shillings to invest AND has basic knowledge of running businesses THEN he should invest in securities.

IF the persons annual income is 50 million AND has basic knowledge of running businesses THEN he should invest in stocks.

IF a person is younger than 30 but older than 22 THEN he should invest in stocks.

IF a person is younger than 30 but older than 22 THEN he has basic knowledge of running businesses.

IF a person wants to invest in stocks THEN he should invest KenGen shares.

Using symbolic representation, show the production-rule knowledge base containing the above information (5 Marks)

### **QUESTION THREE (20 MARKS)**

- a) Describe the following terminologies as used in lexical analysis (6 Marks)
- i) Token
  - ii) Pattern
  - iii) Lexeme
- b) Explain parsing in compiler design (4 Marks)
- c) List any four high level programming languages. Describe one feature of each of the four high level languages (8 Marks)
- d) Enumerate two classified of optimization (2 Marks)

### **QUESTION FOUR (20 MARKS)**

- a) In software development, if we need to choose a language for a project, we need to ask a few questions to ourselves before we make any decision. Highlight any five factors considered in choosing a language (5 Marks)
- b) Program to calculate the area of the rectangle can be implemented in varied ways.
- i) Develop an Algorithm to achieved above solution (5 Marks)
  - ii) Implement algorithm in b (i) using Java language (5 Marks)
  - iii) Implement algorithm in b (i) using Java language Python (5 Marks)

### **QUESTION FIVE (20 MARKS)**

- a) Explain the following programming paradigms giving examples (6 Marks)
- i) Functional programming
  - ii) Imperative programming
  - iii) Object Oriented programming
- b) Describe the advantages of intermediate code in programming languages (4 Marks)
- c) Elucidate the six phases of a compiler (6 Marks)
- d) Examine the attributes of a good language (4 Marks)