

UNIVERSITY EXAMINATIONS

1ST SEMESTER 2022/2023 ACADEMIC YEAR

FOURTH YEAR EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE (ICT)

BICT 416: PRINCIPLES OF PROGRAMMING LANGUAGES

STREAM: R

TIME: 2 HRS

DAY: WED [8.30AM – 10.30AM]

DATE: 07/12/2022

THIS QUESTION PAPER CONSISTS OF THREE (3) PAGES

PLEASE DO NOT OPEN UNTIL THE INVIGILATOR SAYS SO.

INSTRUCTIONS: Answer Question 1 and Any Other Two.**QUESTION ONE: (30 MARKS)**

- (a) Explain the difference between structured programming and object oriented programming paradigms. (4 marks)
- (b) Distinguish between float and double numbers as used in C programming languages. (4 Marks)
- (c) Explain the difference between a Compiler and an Interpreter (4 marks)
- (d) Four of the criteria used to evaluate programming languages are, readability, portability, simplicity, and orthogonality. Explain the meaning of these four criteria, giving an example of each. (8 marks)
- (e) With the help of a program statement, differentiate the following programming concepts:
 - i) Syntax
 - ii) Semantics
 - iii) Pragmatics. (6 Marks)
- (f) Outline four benefits obtained from studying Programming Languages. (4 Marks)

QUESTION TWO: (20 MARKS)

- (a) Object-oriented programming is one of the programming language that is in wide use today. Explain the following terms as used in Object Oriented programming. (10 marks)
 - (i) Polymorphism
 - (ii) Abstraction
 - (iii) Message passing
 - (iv) Encapsulation
 - (v) Class
- (b) Explain the principle of functional languages. Give two examples of functional languages. (5 Marks)
- (c) Discuss the key principles of object oriented programming paradigm. (5 Marks)



QUESTION TWO: (20 MARKS)

- (a) List any FIVE Primary Reasons for Good Programming Language Design. (5 Marks)
- (b) What are some of the advantages of using BNF? (6 Marks)
- (c) How are lexemes recognized? (3 Marks)
- (d) What are some other tasks that are performed by the lexical analyzer? (6 Marks)

QUESTION FOUR: (20 MARKS)

- (a) What is the name of languages that are based on the von Neumann architecture? (2 Marks)
- (b) Name the four categories that programming languages are put into. (8 Marks)
- (c) Java is a statically-typed language, whereas Python is a dynamically-typed language. Carefully explain the difference between static typing and dynamic typing. What are the advantages of static typing, and what are the advantages of dynamic typing? (10 Marks)

QUESTION FIVE: (20 MARKS)

- (a) Identify the fundamental components of logic and briefly explain their functions. (6 Marks)
- (b) Differentiate between the terms atom and model as used in logic programming. (2 Marks)
- (c) Identify and explain the most common operators that are used to construct more complex sentences from atoms. (8 Marks)
- (d) Show that: $p \wedge (p \Rightarrow q) \models q$ without use of truth table. (4 Marks)