



JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND TECHNOLOGY
SCHOOL OF INFORMATICS AND INNOVATIVE SYSTEMS
UNIVERSITY EXAMINATION FOR THE DEGREE OF ACTUARIAL SCIENCE WITH
IT
YEAR 3, SEMESTER 1
2024/2025 ACADEMIC YEAR
MAIN CAMPUS

COURSE CODE: ITB 9207

COURSE TITLE: Data Structures and Algorithms

STREAM: ACTUARIAL

DATE: 10/1/25

EXAM SESSION: 9-11.00 AM

TIME:

2.00 HOURS

INSTRUCTIONS:

- 1) Answer QUESTION ONE (Compulsory) and ANY other TWO questions**
- 2) Candidates are advised not to write on the question paper**
- 3) Candidates MUST hand in their answer booklets to the invigilator while in the examination room**
- 4) Mobile phones are NOT allowed in the examination room.**

JOOUST OBSERVES ZERO TOLERANCE TO EXAMS CHEATING

QUESTION ONE (30 MARKS)

- i) Stack is also called as (2 Marks)
- a) Last in first out
 - b) First in last out
 - c) Last in last out
 - d) First in first out
- ii) level is where the model becomes compatible executable code (2 Marks)
- a) Abstract level
 - b) Application level
 - c) Implementation level
 - d) All of the above
- iii) Inserting an item into the stack when stack is not full is called operation and deletion of item from the stack, when stack is not empty is calledoperation. (2 Marks)
- a) push, pop
 - b) pop, push
 - c) insert, delete
 - d) delete, insert
- iv) Briefly explain by what you understand with words pop and push (4 Marks)
- v) State and explain operations that can be performed on data structures (5 Marks)
- vi) explain what is a queue (2 Marks)
- vii) Discuss the difference between a Stack and An Array (8 Mark)
- viii) Discuss what is data structure (1 Marks)
- ix) Data definition defines a particular data with some characteristics discuss (4 Marks)

QUESTION TWO (20 MARKS)

- a) Discuss why Data Structures are Useful (8 Marks)
- b) Explain the following Basic terminologies as applied in data structure (9 Marks)

- i. Data
 - ii. Data Item
 - iii. Group Items
 - iv. Elementary items
 - v. Attribute and Entity
 - vi. Entity Set
 - vii. Field
 - viii. Record
 - ix. File
- c) Discuss in the form of diagram Non-Linear data structures given data of A to G (3 Marks)

QUESTION THREE (20 MARKS)

- a) There are three situations that are commonly used to compare the execution time of various data structures in a relative way discuss. (6 Marks)
- b) Discuss data structure in terms of a diagram (12 Marks)
- c) What is the circular linked list? (2 Marks)

QUESTION FOUR (20 MARKS)

- a) Explain the steps used to modify a node in linked lists. (10 Marks)
- b) What are the various operations performed on the Queue (10 Marks)

QUESTION FIVE (20 MARKS)

- a) Discuss the various Operations performed on the Stack. (12 Marks)
- b) An algorithm should have some characteristics, explain them (8 Marks)