

QP CODE 2050555202

Reg. No

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DMI-ST. EUGENE UNIVERSITY

ZAMBIA

DEGREE EXAMINATION – JUNE 2024

Semester: V

055CS52 DATA STRUCTURE & ALGORITHM

Time: 3:00 Hours

Max. Marks: 100

Answer any FIVE Questions (5 x 20 = 100 Marks)

1. a) Define an algorithm and explain two ways writing an algorithm. (10 Marks)
b) Describe Five types of algorithms. (10 Marks)
2. a) Write the algorithm of printing the element in elements of an array of size N. (10 Marks)
b) Given that you have a matrix A with the size of 6 rows and 5 columns. Expressing this matrix as a 2 dimension array calculate the memory address for the A [4] [3] element for both row order and column order representation with base address of 1600. (10 Marks)
3. a) Compare and contrast an array to a linked list as data structures. (10 Marks)
b) Distinguish between dynamic memory allocation and static memory allocation. (10 Marks)
4. a) Describe a queue and write an algorithm to insert an element in a linear queue. (10 Marks)
b) Write the prefix notation of the given infix notation using a stack data structure $(A*B)+(C*D)$. (10 Marks)
5. a) Describe linear and write an algorithm for a linear search. (10 Marks)
b) Explain the quick sort algorithm. (10 Marks)
6. a) Explain space complexity of an algorithm. (10 Marks)
b) Find the Big O, Omega, and Theta boundaries of running time function $T(n) = 3n + 6$ of an algorithm. (10 Marks)
7. a) Describe binary search and write the algorithm. (10 Marks)
b) Describe bubble sort and write its algorithm. (10 Marks)