



ADVANCED CERTIFICATE IN COMPUTER STUDIES

LEVEL 5 EXAMINATIONS

FINAL INTEGRATED SUMMATIVE EXAMINATIONS

SITTING: NOVEMBER/DECEMBER 2022

SUBJECT: PROGRAMMING II

TIME: THREE (3) HOURS

TOTAL MARKS 100

PASS MARK: 50

INSTRUCTIONS

1. Write your examination number and National Registration Card number on the answer Booklet provided. Ensure to append your signature in the space provided on the answer booklet.
2. Write your answer SCRIPT SERIAL NUMBER on the examination register provided and the entry slip.
3. There are Seven (7) questions in this paper.
4. Attempt any Five (5) questions of your own choice.
5. Each questions carries Twenty (20) marks.
6. Cell phones and programmable calculators are NOT allowed in the examination room.

DO NOT TURN THIS PAPER UNTIL YOU ARE TOLD TO DO

QUESTION 1

- a) Describe a hash table. (4 marks)
- b) Describe the different methods of collision resolution in hashing. (6 marks)
- c) The following values are to be stored in a hash table: 25, 42, 96, 101, 102, 162, 197 (5 marks)
- d) Describe how the values are hashed by using division method of hashing with a table size of 7. Use chaining as the method of collision resolution. (5 marks)

Total (20 Marks)**QUESTION 2**

- a) Describe the concept of a data structure. (3 marks)
- b) List **five (5)** areas in which data structures are applied extensively. (5 marks)
- c) Explain dynamic data structures. (2 marks)
- d) Differentiate Linear Data Structure from Non-Linear Data Structure. (6 marks)
- e) State the prefix and post fix notation of the expression $(a + b) * (c - d)$. (4 marks)

Total (20 Marks)**QUESTION 3**

- a) Define a string. (2 marks)
- b) Explain **three (3)** limitations of arrays. (6 marks)
- c) Explain the difference between a stack and a Queue. (6 marks)
- d) Explain the meaning of postfix expression. (4 marks)
- e) State the postfix equivalent of the prefix $* + ab - cd$. (2 marks)

Total (20 Marks)**QUESTION 4**

- a) Define the term function. (2 marks)
- b) Outline **four (4)** advantages of using functions in programming. (8 marks)
- c) Using C++/Java/ Visual Basic, write the program which uses a function/method to compute the FACTORIAL of a given positive integer. (10 marks)

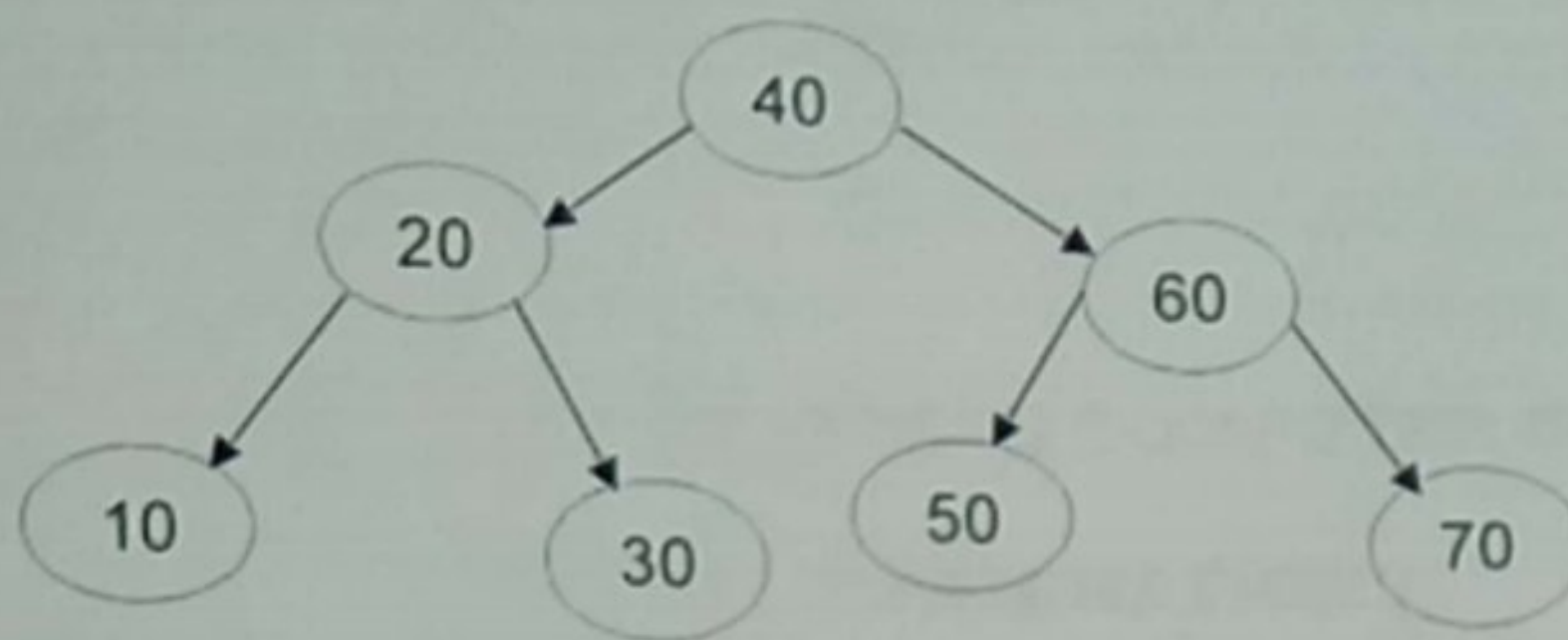
Total (20 marks)**QUESTION 5**

- a) Explain the algorithm. (2 marks)
- b) State **four (4)** characteristics of a good algorithm. (8 marks)
- c) Explain Divide and Conquer algorithms. (5 marks)
- d) Explain the operation of MERGE SORT (5 marks)

Total (20 Marks)

QUESTION 6

a) Study the binary tree below and answer the questions that follow:



There are three ways to traverse a binary tree.

- (i) Define the **three (3)** traversal methods. (3 marks)
 - (ii) Traverse the above tree using the **three (3)** ways you mentioned in Part (i). (6 marks)
- b) Define a Binary Search Tree. (6 marks)
- c) State **five (5)** operations that can be performed on a Binary Search Tree. (5 marks)

Total (20 Marks)

QUESTION 7

- a) Construct a binary search tree for the following terms: { Cat, Bat, Ant, Rat } (5 marks)
- b) Construct a binary search tree for the following English Sentence { it was the best of times } (5 marks)
- c) Construct a binary tree whose nodes in IN-ORDER and PRE-ORDER traversals are given as follows:

In-order : 1, 2, 3, 4, 5

Pre-order: 4, 2, 1, 3, 5

(10 marks)

Total (20 Marks)