ROLL NO. _____

Code: AC104/AT104 Subject: DATA STRUCTURES WITH C & C++

AMIETE – CS/IT (New Scheme)

Time: 3 Hours **December 2016** **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or the best alternative in the following: (2×10)

a. Which of the following is not a primitive data structure?
(A) Boolean **(B)** Integer
(C) Arrays **(D)** Character

b. Which of the following is a non linear data structure?
(A) Arrays **(B)** Linked List
(C) Stack **(D)** Graph

c. _____ is a Linear list in which item may be added only at one end and item may be removed at the other end.
(A) Queue **(B)** Stack
(C) Recursion **(D)** List

d. _____lined list is a linked list which always contains a special node called the header node.
(A) Circular **(B)** Grounded
(C) Header **(D)** Doubly

e. _____ refers to situation where one wants to delete data from a data structure that is empty.
(A) Free storage **(B)** Underflow
(C) Overflow **(D)** Compaction

f. A tree is said to be _____ if all its levels except possibly the last have the maximum number of elements and if all the nodes at the last level appear as far left as possible.
(A) Balance **(B)** Complete
(C) Threaded **(D)** Expression

g. A connected graph without any cycle is called a _____ graph.
(A) Threaded **(B)** Weighted
(C) Tree **(D)** Balanced

h. Which of the following operations accesses each record exactly once so that certain items may be processed?
(A) Inserting **(B)** Deleting
(C) Traversing **(D)** Searching

i. In _____, the problem of sorting a set is reduced to the problem of sorting two smaller sets.
(A) Quick sort **(B)** Heap sort
(C) Bubble sort **(D)** Insertion sort

j. Which of the following is used to write the string into the file?
(A) fputs **(B)** fgets
(C) gets **(D)** puts

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Explain in detail about the types of complexity **(8)**

b. Write a C program to multiply TWO matrices. **(8)**

Q.3 Elaborate on
a. operations on QUEUES with algorithm. **(8)**

b. Explain static implementation of Stack with algorithm. **(8)**

Q.4 Write an algorithm to perform :
a. Insertion into a doubly linked list **(8)**

b. Deletion from beginning and end from a singly linked list **(8)**

Q.5 a. What are the different techniques for tree traversal? Write the recursive algorithms for each traversal technique. **(12)**

b. What do you understand by height of a tree and degree of a tree? **(4)**

Q.6 a. Define Graph. **(2)**

b. Explain the differences between DFS and BFS. **(6)**

c. Explain the minimum spanning tree algorithms to find the shortest path. **(8)**

Q.7 a. What is hashing? **(2)**

b. What is the importance of hashing in searching? **(4)**

c. Explain the various Searching techniques with algorithm. **(10)**

Q.8 a. What is quick sort? Why it is called partition exchange sort? **(4)**

b. Write the algorithm for bubble sort. **(4)**

c. Write Quick sort algorithm. **(8)**

Q.9 a. Explain the file organization techniques in detail. **(8)**

b. Write a C++ program to create, read and display student's information using files. **(8)**