Code: AC64/AT64 Subject: DESIGN & ANALYSIS OF ALGOR

AMIETE – CS/IT

Time: 3 Hours

DECEMBER 2012

GOR Max. Marks: 100

ROLL NO.

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 the required condition for binary search algorithm?

(A) The list must be sorted

- (B) There should be the direct access to the middle element in any sublist
- (C) There must be mechanism to delete and/or insert elements in list
- **(D)** None of these

b. Two main measures for the efficiency of an algorithm are

(A) Processor and memory	(B) Complexity and capacity
(C) Time and space	(D) Data and space

- c. The time factor when determining the efficiency of algorithm is measured by
 - (A) Counting micro seconds
 - (B) Counting the number of key operations
 - (C) Counting the number of statements
 - (D) Counting the kilobytes of algorithm
- d. The space factor when determining the efficiency of algorithm is measured by
 - (A) Counting the maximum memory needed by the algorithm
 - (B) Counting the minimum memory needed by the algorithm
 - (C) Counting the average memory needed by the algorithm
 - (D) Counting the maximum disk space needed by the algorithm
- e. The Worst case occur in linear search algorithm when
 - (A) Item is somewhere in the middle of the array
 - (B) Item is not in the array at all
 - (C) Item is the first element in the array
 - (D) Item is the last element in the array or is not there at all

AMIETE - CS/IT

1

f. The complexity of linear se	earch algorithm is
$(\mathbf{A}) \mathbf{O}(\mathbf{n})$	$(\mathbf{B}) O(\log n)$
$(\mathbf{R}) O(\mathbf{n})$ $(\mathbf{C}) O(\mathbf{n}^2)$	$(\mathbf{D}) O(\log n)$
	(\mathbf{D}) O(II log II)
g. The complexity of merge so	ort algorithm is
(A) O(n)	(B) O(log n)
(C) $O(n^2)$	(D) $O(n \log n)$
n. The operation of processing	g each element in the list is known as
(A) Sorting	(B) Merging
(C) Inserting	(D) Traversal
. Finding the location of the	element with a given value is:
(A) Traversal	(B) Search
(C) Sort	(D) None of these
j. The heap data structure is u	seful for implementing
(A) Priority queues	(B) Dequeue
(C) Linked List	(D) Stacks

- b. Explain various data structures used in algorithm design. Give their applications. (8)
 Q.3 a. What is the difference between time complexity and space complexity? (8)
 - b. Write an algorithm for analyzing the efficiency of recursive algorithms. (8)
- Q.4 a. What is the best, average and worst case inputs for the algorithm of sequential search. (6)
 - b. Explain "Divide & Conquer Technique". (6)
 - c. Explain Brute force string matching algorithm. (4)
- Q.5 a. Define BFS. Explain with the help of example how it differs from DFS. (8)

Code: AC64/AT64 Subject: DESIGN & ANALYSIS OF ALGOR

studentBounty.com What is the time efficiency of the DFS based algorithm for topologic b. sorting?

ROLL NO.

- 0.6 a. Define AVL trees. Explain four rotation types for AVL trees with three nodes. Give an illustration.
 - b. Explain the heap sort in detail. Give its complexity. (8)
- a. With the help of example, differentiate between Prim's and Kruskal's **Q.7** algorithm. (8)
 - b. Using Dijkstra's algorithm, find the shortest path from a to e. (8)



- **Q.8** a. Explain the Hashing technique in detail. What is the difference between open hashing and closed hashing. Explain B-trees. (8)
 - b. What are NP, NP complete and NP hard problems? (8)
- 0.9 a. Solve the following instance of the Knapsack problem by the branch-andbound algorithm. (W=10) (8)

i	1	2	3	4
v_i	10	40	30	50
w_i	5	4	6	3

b. Write about Bisection Method for solving Non-Linear Equations. Give a suitable example to explain. (8)

3