AR–2505

Faculty of Engineering & Technology

M.C.A. First Year Semester–II (C.G.S.) Examination

DATA STRUCTURES & ALGORITHMS

(15510)

Paper—2 MCA 1

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Assume suitable data wherever necessary.

(3) Illustrate your answers wherever necessary with the help of neat sketches.

(4) Use pen of Blue/Black ink/refill only for writing the answer book.

1. (A) What do you mean by term "Algorithm" ? Write down various mathematical notations used in algorithm. 8

(B) Distinguish between best, worst and average case complexities of an algorithm. 6

OR

2. (A) Consider 'X' and 'Y' as two strings with length 'M' & 'N' respectively and stored as character arrays. Write pattern matching algorithm to find X in Y. 8

(B) Define the terms with respect to pattern matching operation :

(i) Replacement

(ii) Insertion

(iv) Deletion. 6

3. (A) Explain with suitable diagram and example how a linear array can be represented in memory. 7

(B) Which are the different basic operations supported by an array ? 6

OR

4. (A) Explain the insertion operation to insert one or more data element into an array with suitable example. 6

(B) What do you mean by "Pointer Array" ? Explain with example. 7

5. (A) Illustrate with an example, the linked list representation of graph. 6

(B) Write suitable routines to perform insertion and deletion operations in a linked list. 7

OR

6. (A) Given a single linked list 'L', formulate separate algorithms to :

Insert an element 'X' after a position 'P' in the list. 6

(B) Write an algorithm to delete the first occurrence of an element Y from the given linked list "L" with a suitable example. 7

7. (A) Explain, how stacks are represented in memory. Explain the "PUSH" and "POP" operations on stack. 7

(B) What do you mean by queue ? Explain with suitable example. 6

OR

8. (A) Write down an algorithm for quick sort with suitable example. 7.

(B) What do you mean by priority queues ? Explain with suitable example. 6

9. (A) What is an AVL tree ? Explain the notations of AVL tree. 8

(B) Give an algorithm to convert a general tree to binary tree. 6

OR

10. (A) State and explain the algorithm to perform "Heap" sort with an example. 8

(B) Explain how binary trees are represented in memory with suitable example. 6

11. (A) Explain, what do you mean by sequential representation of graphs. 7

(B) State and explain the algorithm to perform "Merg" sort with suitable example. 6

OR

12. State and explain the algorithm for operation and traversing the graph. 13