(i) Printed Pages : 3 Roll No. .....

(ii) Questions : 9 Sub. Code : 0 9 3 2

Exam. Code : 0 0 2 9

Bachelor of Computer Applications 3rd Semester

(1129)

DATA STRUCTURES

Paper—BCA–16–305

Time Allowed : Three Hours] **[Maximum Marks : 65**

Note :— Attempt **five** questions in all. Select **one** question each from Sections A–D. Section E is compulsory.

SECTION—A

1. (a) What do you mean by an algorithm ? What are the characteristics of a good algorithm ? How do we determine the complexity of an algorithm ? Explain. 8

   (b) What are the major applications of data structures ? Illustrate with live examples. 5

2. (a) Write down an algorithm to input the elements in a Two Dimensional (2D) array and then display the count of only those elements of array which are divisible by 5. 8

   (b) What is a stack ? What kinds of problems are solved using stack data structure ? Give examples. 5

SECTION—B

3. (a) Write down algorithms to insert elements into and delete elements from a circular linked list. 8

   (b) What is a header linked list ? What kinds of operations are performed on header linked list ? Discuss. 5

4. (a) Write down algorithms to perform following operations on a Queue (implemented using linear array) :

(i) Insert an item

(ii) Delete an item. 8

(b) What is a Doubly Linked List ? How is it represented in memory ? How does it differ from other types of linked lists ? Describe. 5

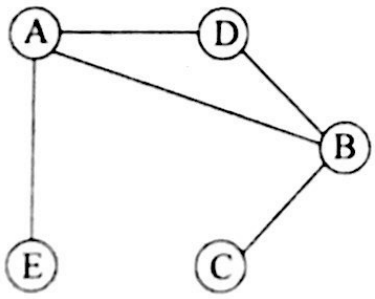
SECTION—C

5. (a) What do you mean by Binary Tree ? How is it represented in contiguous storage ? Brief out. Also show all the steps to construct a Binary tree for following sequence of nodes :

7, 10, 3, 6, 8, 4. 8

(b) How adjacency matrix is used to represent a graph in memory ? Discuss. 5

6. (a) What is a graph ? What are various graph traversal techniques ? Discuss them with the help of following graph (Start from node A) : 8



(b) What is a Binary Search Tree ? What are different ways to traverse it ? Briefly discuss. 5

SECTION—D

7. (a) Write down the algorithm of Binary search. How is Binary search more efficient than Linear search ? Explain with an example. 8

   (b) Draw a comparison between Selection sort and Bubble sort techniques. 5

8. (a) How Divide and Conquer technique is used to perform efficient sorting ? Describe with the help of Quick Sort. 8

   (b) List down the main steps followed to find a number with Linear search. 5

SECTION—E

(Compulsory)

9. (a) What is *push* and *pop* in context of stacks ? 2

   (b) What are the limitations of arrays ? 2

   (c) How is circular queue different from a simple queue ? 2

   (d) List any two applications of linked lists. 2

   (e) What do you mean by depth of a binary tree ? 2

   (f) Define the terms "*Path*" and "*Cycle*" in context of graphs. 2

   (g) What is the time complexity of Merge sort algorithm ? 1