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(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA-203

(Data Structure Using C)

(New Course)

Full Marks : 75

Time : 3 hours

(PART : B—DESCRIPTIVE)

(Marks : 50)

*The figures in the margin indicate full marks
for the questions*

1. Answer the following questions :

- (a) Why do we need for allocating the memory dynamically? Explain malloc() and calloc(). 4
- (b) Explain the following terms : 6
 - (i) Pointer declaration and initialization
 - (ii) Pointers and arrays
 - (iii) Space and time complexity of an algorithm

Or

- (c) Define data structure. Explain different types of data structures. 4
- (d) Explain the following terms : 6
- (i) Arrays of pointers with an example
 - (ii) Arrays and functions with an example
2. (a) Write a C program code for implementing a linear search technique. 5
- (b) Write a C program code for sorting from a list of numbers using selection sort. 5
- Or
- (c) Write a C program for implementation of binary search. 5
- (d) Form a heap from the set of elements (40, 80, 35, 90, 45, 50, 70) and sort using heap sort. 5
3. (a) What is priority queue? Write the C functions code of push() and pop() for stack using array. 5
- (b) Convert the infix expression $A + (B * C - (D / E ^ F) * G) * H$ to postfix form using stack. 5

(3)

Or

(c) Evaluate the given postfix expression

3, 5, +, 6, 4, -, *, 4, 1, -, 2, ^, +

using stack. 5

(d) Write the C functions code of insert() and delete() operations for circular queue. 5

4. (a) Write the C function of deleting a node in the intermediate position for a single-linked list. 4

(b) Write the C functions code of insert and delete a node at beginning for a circular linked list. 6

Or

(c) Differentiate between array and linked list. 4

(d) Write any two C functions code for implementation of double-linked list. 6

5. (a) What is binary search tree? Draw the binary tree using the following list of order nodes : 5

preorder : / ^ + 6 * - 3 2 5 7 3

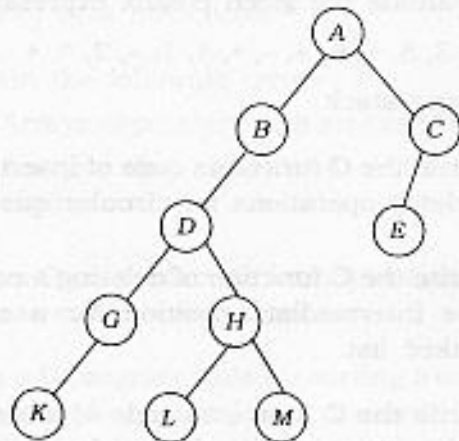
inorder : 6 + 3 - 2 * 5 ^ 7 / 3

(b) Explain internal and external nodes of a binary tree. 2

(4)

(c) Traverse the following binary tree in preorder, inorder and postorder :

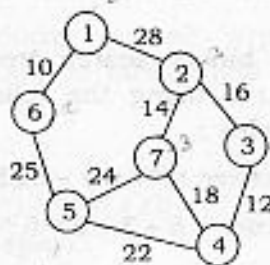
3



Or

(d) Construct the minimal spanning tree for the graph shown below using Kruskal's algorithm :

5



(5)

(e) Use Prim's algorithm to find a minimal spanning tree for the graph shown below starting with the vertex A :

5

