Data Structures Using 'C'

S.Y. Diploma : Sem. III

[CO/CM/IF/CW]

Time: 3 Hrs.] Prelim Question Paper **[Marks : 70**

Instructions : (1) All questions are compulsory.
(2) Illustrate your answers with neat sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

1. Attempt any **FIVE** of the following : **[10]**

(a) Explain the concept of information, Next, Null pointer and empty list with respect to link list.
(b) Describe priority queue with example.
(c) Define queue? Explain how pointer front and rear related to queue with diagram.
(d) Convert the following infix expression to its postfix form using stack A + B – C*D/E + F.
(e) Describe given two types of graphs: Directed and undirected graph.
(f) Explain time complexity and space complexity.
(g) Write any four applications of data structure.

2. Attempt any **THREE** of the following : **[12]**

(a) Explain stack overflow and underflow conditions with example.
(b) Write an algorithm to insert and delete an element from queue.
(c) Differentiate between tree and graph w.r.t. any 4 parameters.
(d) Write an algorithm to insert a node in between in a link list.

3. Attempt any **THREE** of the following : **[12]**

(a) Write an algorithm for inorder traversal of binary tree.
(b) For the following directed graph :
  (i) Give adjacency matrix representation.
  (ii) Give adjacency list representation.
(c) Write an algorithm to implement binary search.
(d) Implement C Program for performing following operations on Array : Insertion, Display.

4. Attempt any **THREE** of the following : **[12]**

(a) Explain the concept of double ended queue.
(b) Describe circular queue with an example.

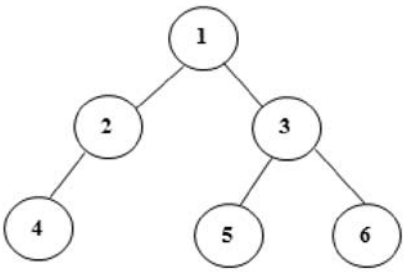
(c) Show the effect of INSERT and DELETE operations on to the Linear queue of size 10. The Linear queue sequentially contains 10, 20, 30, 40, and 50 where 10 is at front of the queue. Show diagrammatically the effect of :
(i) INSERT (12) (ii) INSERT (34) (iii) DELETE (iv) INSERT (56)

(d) Construct the binary search tree using following elements:
35,15,40,7,10,100,28,82,53,25,3. Show diagrammatically each step of construction of BST.

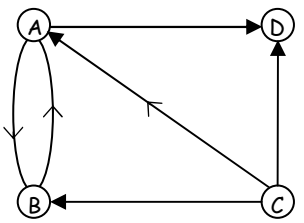
5. Attempt any **TWO** of the following : **[12]**

(a) Write an algorithm to count number of nodes in singly linked list.

(b) From the given tree complete six answers :
(i) Degree of tree
(ii) Degree of node 3
(iii) Level of node 5
(iv) Indegree of node 3
(v) Outdegree of node 3
(vi) Height of tree



(c) Consider the graph given in Figure. Find its adjacency matrix and adjacency link representation.



6. Attempt any **TWO** of the following : **[12]**

(a) Create a Singly Linked List using data fields 10, 20, 30, 40, 50. Search a node 40 from the SLL and show procedure step-by-step with the help of diagram from start to end.

(b) Describe breadth first search traversal in a graph with example.

(c) Convert the given infix string to prefix expression and shows the details of stack at each step.
$(A - B/C) * (D * E - F)$

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S.Y. Diploma Sem-III: Paper Discussion Schedule

Branches	Date	Day	Timing	Centres
Computer Group	8 Nov. 2018	Thursday	9 a.m. to 11 a.m.	Thane
	9 Nov. 2018	Friday	9 a.m. to 11 a.m.	Borivali, Dadar