



Name :
Roll No. :
Invigilator's Signature :

CS/B.Sc(H)(BT/GE/MICRO/MOL-BIO)/SEM-3/CA-301/2011-12

2011
INTRODUCTION TO DATA STRUCTURE AND
COMPUTER ORGANIZATION

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words
as far as practicable.

GROUP – A
(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) An element of stack will be deleted from
- | | |
|-----------|-------------------|
| a) Top | b) Middle |
| c) Bottom | d) none of these. |
- ii) In POLISH notation priority of ‘ * ’ is
- | | |
|--------|-------------------|
| a) 1st | b) 2nd |
| c) 3rd | d) none of these. |



- iii) What is referred by FRONT = REAR in Queue if both of them are NULL ?
- a) Only one element in the Queue.
 - b) More than one element in the Queue.
 - c) No element in the Queue.
 - d) None of these.
- iv) Linked List is not suitable for
- a) Insertion sort
 - b) Binary search
 - c) Merge sort
 - d) Polynomial manipulation.
- v) Which of the following name does not relate to stacks ?
- a) FIFO lists
 - b) LIFO list
 - c) Piles
 - d) Push-down list.
- vi) A vertex of degree one is called as
- a) pendant vertex
 - b) isolated
 - c) null vertex
 - d) coloured vertex.
- vii) If there exist at least one path between every pair of vertices in a graph, the graph is known as
- a) complete graph
 - b) disconnected graph
 - c) connected graph
 - d) Euler graph.



- viii) The terms “push” and “pop” are related to the
- a) array
 - b) stacks
 - c) lists
 - d) all of these.
- ix) A graph in which all nodes are of equal degree is called as
- a) complete graph
 - b) regular graph
 - c) multi-graph
 - d) non-regular graph.
- x) Any element of a queue will be deleted from
- a) top
 - b) rear
 - c) front
 - d) middle.
- xi) Which searching technique will be faster ?
- a) Linear search
 - b) Bubble sort
 - c) Binary search
 - d) None of these.
- xii) DMA is for
- a) low speed data transfer
 - b) medium speed data transfer
 - c) high speed data transfer
 - d) none of these.

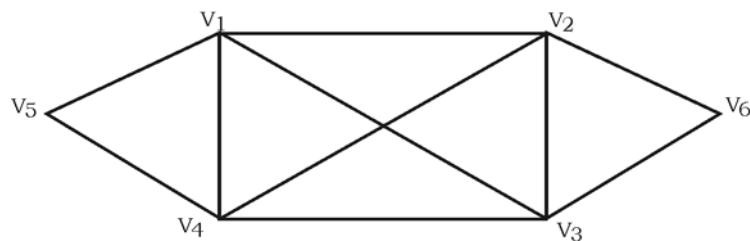


GROUP - B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

2. Compare between array and linked list.
3. Write an algorithm or a function for insert operation into a circular queue. What is the difference between queue & circular queue ? 3 + 2
4. Write an algorithm or function for Push and POP operation in respect of a Stack.
5. a) Why is a Queue data structure called FIFO and a Stack data structure is called LIFO ?
b) Find the degree of each of the vertex of the following graph :



2 + 3

6. Calculate the simplified result of the following post fix notation :

10, 5, 4, +, *, 30, 7, 1, -, =



GROUP – C

(Long Answer Type Questions)

Answer any *three* of the following. $3 \times 15 = 45$

7. a) Write an algorithm or function for Bobble Sort.
- b) Draw a directed graph for the following adjacency matrix :

$$A = \begin{bmatrix} 1 & 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 1 & 0 & 1 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 & 1 & 0 \\ 0 & 1 & 1 & 1 & 0 & 1 & 0 \\ 1 & 0 & 0 & 1 & 1 & 0 & 0 \\ 0 & 0 & 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}$$

7 + 8

8. Write the function for singly linked list for the following operations :

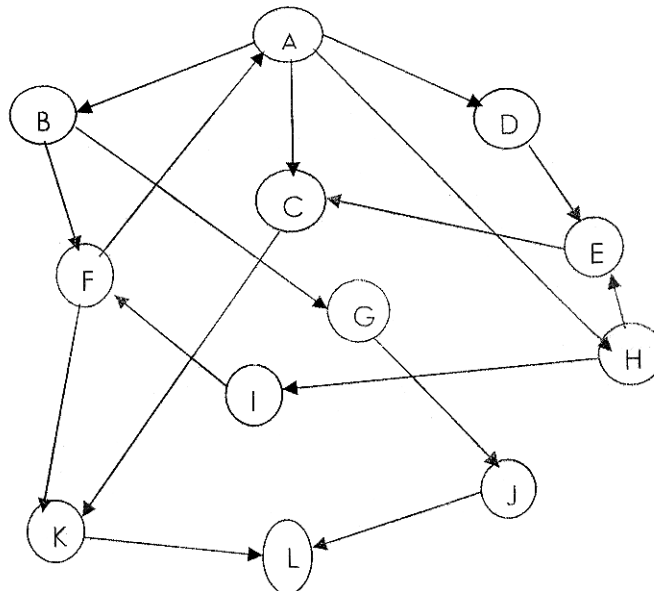
- a) Create a node to a list.
- b) Deletion of a node from the end
- c) Count the number of nodes in the list. $5 + 5 + 5$



9. a) Define regular graph and null graph with examples.
 b) Using POLISH notation convert the following infix notation into postfix notation :

$$A - (B / (C + D \uparrow) E) * F \uparrow G$$

- c) Write an algorithm or function for insertion of an element into a queue using array. $(2 + 2) + 6 + 5$
10. a) What are in-degree and out-degree of a vertex ? Define degree of a vertex and Loop with examples.
 b) Using BFS algorithm, find the path which traverses minimum nodes of the following graph of which Starting node is "A" and destination node is "L".



5 + 10



11. Write short notes on any *three* of the following :

- a) Deque
 - b) Doubly linked list
 - c) Selection sort
 - d) DFS
 - e) ROM.
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