

**SECOND SEMESTER B.Voc. DEGREE EXAMINATION, APRIL/MAY 2015****(CUCBCSS-UG)**

Software Development

**SDC 2IT 05 – DATA STRUCTURES**

Time : Three Hours

Maximum : 80 Marks

**Part A***Answer **all** the questions.*

1. The term data structure refers to \_\_\_\_\_ and interrelationship between them.
  - (a) Programming language statements.
  - (b) Organization of data element.
  - (c) Coding standard.
  - (d) None of these.
2. Access to the links in a linked list is usually through \_\_\_\_\_ link.
3. Inserting an item into the stack when the stack is not full is called \_\_\_\_\_ operation.
  - (a) Push.
  - (b) POP.
  - (c) Insert.
  - (d) Delete.
4. For an undirected graph with  $n$  vertices and  $e$  edges, the sum of the degree of each vertex is equal to \_\_\_\_\_.
  - (a)  $2n$ .
  - (b)  $(2n - 1)/2$ .
  - (c)  $2e$ .
  - (d)  $2e/2$ .
5. What is the number of leaf nodes in a full binary tree of height  $h$ ?
  - (a)  $2^h$ .
  - (b)  $2^{(h + 1)}$ .
  - (c)  $2^{(h - 1)}$ .
  - (d)  $h$ .
6. AVL tree is a kind of :
  - (a) Binary Tree.
  - (b) Binary Search tree.
  - (c) Heap Tree.
  - (d) Treaded Tree.
7. Which of the following is used to find minimum spanning tree?
  - (a) Dijkstra's Algorithm.
  - (b) Kruskal's Algorithm.
  - (c) Tree finding algorithm.
  - (d) None of these.

**Turn over**

8. The OS of a computer periodically collect all the free memory space to form contiguous blocks of a free space. This is called \_\_\_\_\_
- (a) Concatenation. (b) Garbage collection.  
(c) Collision. (d) Dynamic Memory allocation.
9. Direct chaining is also known as \_\_\_\_\_
- (a) Linear Probing. (b) Quadratic Probing.  
(c) Double hashing. (d) Separate chaining.
10. If the number of records to be sorted is large and the key is small, then \_\_\_\_\_ sorting can be efficient.
- (a) Merge. (b) Heap.  
(c) Quick. (d) Bubble.

(10 x 1 = 10 marks)

### Part B

Answer any **eight** questions, not exceeding a paragraph of 50 words

11. Write column major representation of a 2D array
12. What do you mean by traversing a list?
13. What is an ordered list?
14. What are the types of priority queue?
15. Explain any *two* applications of stack.
16. What is a strict binary tree?
17. Explain the advantages of a threaded binary tree.
18. Compare dense graph and sparse graph.
19. What are the graph representation methods?
20. What is the use of BFS?
21. Name some collision resolution techniques.
22. What is the necessary condition for implementing Insertion sort?

(8 x 2 = 16 marks)

### Part C

Answer any **six** questions, in a page of 50 words.

23. Write a short note on the need for data structures.
24. Explain about the sparse matrix representation of a *two* dimensional array.
25. Write an algorithm to insert a new node in the middle of a singly linked list.

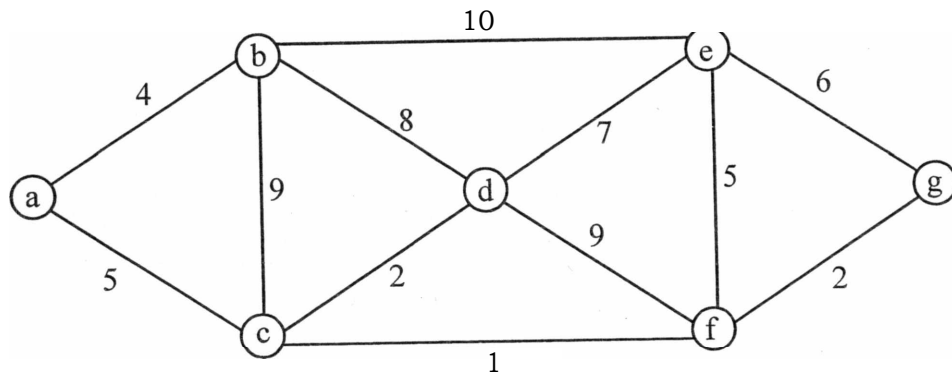
26. Briefly explain about various applications of stacks.
27. How do we compliment circular queue using a linked list?
28. Briefly explain about the Preorder traversal of a binary tree?
29. Explain about threaded binary trees.
30. Explain about various graph traversal methods.
31. Explain the algorithm for Quick sort with a suitable example.

(6 x 4 = 24 marks)

### Part D

Answer any **two** questions, not exceeding four pages.

32. Convert the given infix expression to postfix form using stack and show the details of stack at each step of conversion. Expression:  $(a + b * c^A d) * (e + f / g)$ . Note: <sup>A</sup> indicates exponent operator.
33. What are the various tree traversal techniques? Explain with an example.
34. Explain Prim's Algorithm to find the minimum cost spanning tree. Trace the algorithm in the following graph to find the minimum cost spanning tree.



35. Explain Heap sort algorithm with an example.

(2 x 15 = 30 marks)