Register Number.....

**B.E. & B.TECH. DEGREE EXAMINATIONS: OCTOBER / NOVEMBER - 2008**

Second Semester

**U07CS201: Data Structures**

**(Common to Computer Science and Engineering & Information Technology)**

**Time: Three Hours** **Maximum Marks: 100**

**Answer ALL Questions: -**

**PART A (20 X 2 = 40 Marks)**

1. Consider the following statements

   i) Data structure refers to data type and storage representation
   ii) Data structure is a physical representation of an Abstract data type

   A. Both are true B. Both are false C. i is true and ii is false D. ii is true and i is false

2. The data structure used to perform recursion is

   A. tree B. stack C.queue D.list

3. If $f(n)=6n^3+2$ .What is O(f(n))?

   A. $n^2$ B. n C. $n^3$ D. 1

4. Time Complexity of an algorithm indicates the ---------- of the algorithm

   A. compile time B. run time (as a function of input)
   C. clock-time D. run time(as a function of output)

5. Which of the following is not an application of a stack?

   A. solving tower of hanoi problem B. checking of well-formedness of parenthesis
   C. evaluation of postfix experession D. reservation counter

6. A priority queue is implemented as Max-heap. Initially it has 5 elements. The level order traversal of the heap is given as 10, 8, 5, 3, 2. Two new elements 1 and 7 are inserted in the heap in that order. Now the order becomes

   A. 10,8,7,5,3,2,1 B. 10,8,7,2,3,1,5 C. 10,8,7,1,2,3,5 D. 10,8,7,3,2,1,5

7. Memory utilization can be improved using a ----------

   A. queue B. stack C. tree D. linked list

8. Consider the following statements

   i) A Queue cannot be implemented using linked lists
   ii) A Queue can be simulated using a dequeue

   A. Both are true B. Both are false C. i is true and ii is false D. ii is true and i is false

9. A Skew tree has -------- node(s) in every level

   A. 2 B. 3 C. 1 D. 2 or 3

10. In Preorder traversal of a binary tree---------- ordering is followed

    A. left, root, right B. root, left, right C. left, right, root D. right, root, left

11. Expected time of insertion, deletion and search is --------in hashing

    A. O(n) B. O(1) C. $O(n^2)$ D. $O(n^3)$

12. ---------- is not a collision resolution technique

    A. Linear probing B. Double hashing C. dequeueing D. Chaining

13. The average case running time of Quick sort is ----------

    A. O(n) B. O(1) C. $O(n^2)$ D. O(n log n)

14. Consider the following statements about External sorting?

1. sorting is done on data stored on disks
2. sorting is done on data stored in main memory

A. Both are true B. Both are false C. i is true and ii is false D. ii is true and i is false

15. ---------- is the other name for Partition exchange sort

A. Merge sort B. Shell sort C. Quick sort D. Radix sort

16. Which of the following problems can be solved using Dijkstra's Algorithm?

A. Finding the min-cost spanning tree
B. Sorting of numbers
C. Multiplication of large numbers
D. Finding the shortest paths

17. For a list L={7,3,9,1,8} the output list at the end of Pass 1 of bubble sort would yield

A. 3,7,1,9,8 B. 3,7,1,8,9 C. 3,1,7,9,8 D. 1,3,7,8,9

18. Graphs can be represented using ----------

A. diagonal matrix B. adjacency matrix C. identity matrix D. square matrix

19. Which among the following properties is not satisfied by a minimum cost spanning tree T extracted from a graph with n vertices?

1. T has a cycle 2. T has (n-1) edges 3. T has n vertices

A. (1) B. (2) C. (3) D. (2 and 3)

20. ---------- data structure is used for Depth First Search(DFS) in graphs

A. Stack B. Queue C. List D. Array

**PART B (5 X 12 = 60 Marks)**

21. a) i) Given two variables of integer type a and b, exchange their values without using a third temporary variable.Write the algorithm and analyze the time complexity. Compare the complexity of this algorithm with the one that uses a temporary variable for swapping. (6)

ii) Write an algorithm to generate the first n terms of the sequence
1 2 4 8 16 32.... (6)

**(OR)**

21 b) i) Design an algorithm to convert binary numbers to hexa decimal numbers. (6)

ii)Write an algorithm that reads a list of numbers and makes a count of the number of negative and positive numbers in the set. (6)

22. a) i) How are priority queues implemented using a single queue? (6)

ii) Present an algorithm for insertion and deletion in a singly linked list (6)

**(OR)**

22 b) i) Write a recursive program to generate Fibonacci series (6)

ii) Present an algorithm for insertion and deletion in a doubly linked list (6)

23. a) i)Construct a binary search tree T for the following set S of elements in the order given: S={INDIGO, GREEN, VIOLET, RED, BLUE,ORANGE,YELLOW,PINK} (6)

ii) Construct an AVL search tree using the following data. Perform the appropriate rotations to rebalance the tree. OS/2, LINUX, MAC, UNIX, WINDOWS (6)

**(OR)**

23. b) i) Explain any 2 collision resolution techniques with open addressing. (6)

ii) Write non-recursive procedures to perform the inorder, postorder and preorder traversals of a binary tree. (6)

24. a) i) Quicksort the list L={S,G,L,M,A,Z}. Also write the algorithm (6)

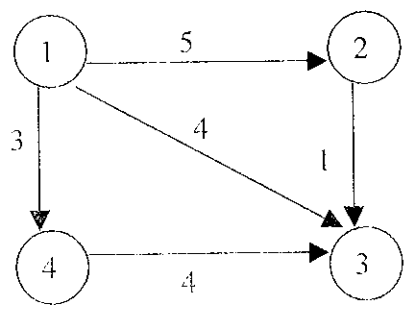
ii) Explain insertion sort with an example (6)

**(OR)**

24 b)i)What is the principle behind the heapsort procedure. Trace heap sort on the list L={35,67,0,99,13,46,100}. (10)

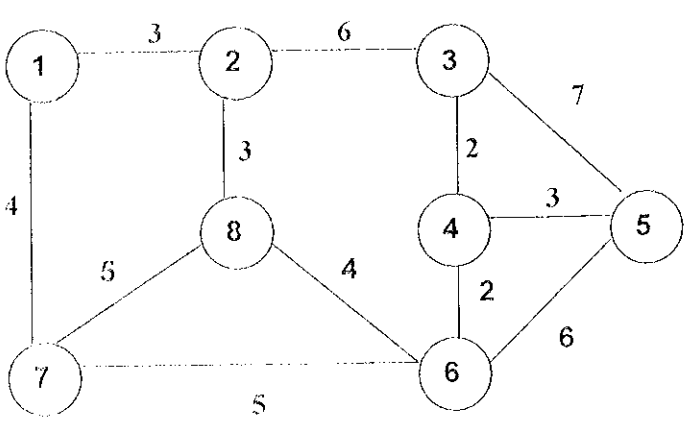
ii) Bring out the importance of External sorting (2)

25. a) For the following graph, find the shortest path lengths from Source vertex 1. Write the procedure to generate shortest paths. (12)




**(OR)**

25 b) Compute the minimum cost spanning tree for the following graph using Prim's method. Also write the algorithm. (12)

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