Register Number:.....

**B.E. DEGREE EXAMINATIONS: OCTOBER / NOVEMBER 2008**

Third Semester

**ELECTRONICS AND COMMUNICATION ENGINEERING**

**U07EC302: Data Structures**

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

**Answer ALL Questions: -**

**PART A (20 X 1 = 20 Marks)**

1. The time complexity of binary search algorithm is
   i) logN ii)N iii) Nlog N iv) 1

2. The algorithm whose function is represented by $g(n) = 3n^2+6n+3$, the time complexity for this algorithm is given by
   i)$o(n^2)$ ii) o(logn) iii) o(n) iv) d(l)

3. Evaluate $\lim_{n\to\infty} \frac{4n^2+8n+5}{n^2}$ =?
   i) 4 ii) 8 iii) 2 iv) 5

4. The time complexity for finding the factorial of a given number using recursion is
   i)0 (N) ii)0(1) iii) 0(NlogN) iv) 0(logN)

5. For the find and find previous routines in linked list the worst case running time is
   (i) 0 (N) ii) 0(1) iii)0(2N) iv)0(logN)

6. A value of _____ for Next is the equivalent of a Null pointer in cursor implementation of linked lists.
   i) '\0' ii) Null iii)0 iv) 1

7. Stack is known as _____ lists
   i) LILO ii) FIFO iii) LIFO iv) FILO

8. The postfix expression of a+b*c+(d*c+f) *g is
   i) abc*+de*ftg*+ iii) ab+c*de*fg*+t
   ii) ab+*cdc*fg+*+ iv) abc+*dc*fg+*+

9. Nodes with the same parent are called
   i) leaves ii) child iii) siblings iv) descendants

10. In an AVL Tree, the height of the left and right subtrees can differ by at most_____
    i) 1 ii) 0 iii)-1 iv) 2

11. When two keys hash to the same value is known as _____
    i) Probing ii) collision iii) open addressing iv) closed addressing

12. The height of a complete binary tree is
    i)$2^n$ ii) N iii) logN iv) $2^n$-1

13. Insertion sort consists of _____ passes
    i) N ii) N/2 iii) N-1 iv) N+1

14. The average case analysis of quick sort is
    i) 0(NlogN) ii) 0(logN) iii) 0(N) iv 0(N2)

15. In Heap sort, to store the deleted element an extra array is needed but this occupies space. This can be avoided by shrinking the heap by
    i)1 ii)2 iii)N iv)N-1

16. _____ sorting algorithm is used for handling very large inputs

i) External ii) Quick sort iii) Insertion sort iv) shell sort

17. Topological ordering is possible only if graph is

i) cyclic ii) connected iii) acyclic iv) undirected graph

18. The number of edges in a minimum spanning tree is

i) |V| ii)|V| +1 iii) |V|-1 iv) E

19. Traveling salesman problem is an example of

i) NP hard problem ii) NP complete problem

iii) linear problem iv) Deterministic polynomial time problem.

20. The time to perform topological sorting is _____ if adjacency lists are used.

i) 0(|E|+|V|) ii) 0(|E|log|N|) iii) 0 ($LV^2$) iv) 0(|E|+|V|2)

**PART B (5 X 16 = 80 Marks)**

21. (a) Explain top-down design with neat sketch.

**(OR)**

21. (b) Explain in detail the analysis of algorithms.

22. (a) Define ADT. Explain linked list ADT and its operations with an algorithm.

**(OR)**

22. (b) Explain the three applications of stack with suitable example.

23. (a) Write an algorithm and explain how to insert and delete an element in a binary search tree ADT with an example.

**(OR)**

23. (b) i) Show the result of inserting 2,1,3,5,4,9,8,6,7 into an initially empty AVL tree. (8)

ii) Given input {4371, 1323, 6173, 4199, 4344, 9679, 1989} and a hash function h(X)= X mod 10, show the resulting:

a) Separate chaining hash table (4)

b) Open addressing hash table using linear probing (4)

24. (a) Write shellsort algorithm and show the result of running shellsort on the input 9,8,7,6,5,4,,3,2,1 using the increments{ 1,3,7}

**(OR)**

24. (b) Write Quick sort Algorithm and do the average – case analysis?

25. (a) With suitable example explain the Dijikstras algorithm and write the pseudo code.

**(OR)**

25. (b) Explain NP- complete problem and describe why traveling salesman problem is NP Complete.

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