Register Number .....

B.E. DEGREE EXAMINATIONS: NOVEMBER 2009

Third Semester

U07EE305 / U07EI304: DATA STRUCTURES AND ALGORITHMS

(Common to Electrical and Electronics Engineering & Electronics and Instrumentation Engineering)

Time: Three hours **Maximum Marks: 100**

Answer ALL the Questions:-

PART A (10 x 1 = 10 Marks)

1. _____ is a function calling itself again and again

   a. Structure b. Recursion c.Union d.Stack

2. _____variables are variables that are allocated storage when the function is invoked.

   a. External b. Automatic c. Static d. Dynamic

3. A _____ is an ordered collection of items from which items may be deleted at one end and into which items may be inserted at the other end.

   a. Stack b.Queue c. tree d. graph

4. In a _____ list, the next field in the last node contains a pointer back to the first node rather than the null pointer.

   a. doubly b. linear c. circular d. queue

5. If every non-leaf node in a binary tree has nonempty left and right sub-trees ,the tree is termed as a _____

   a. balanced tree b. strictly binary tree c. AVL tree d. skew tree

6. The in-order tree traversal is also known as _____ order.

   a. depth-first b. breadth-first c. symmetric d. asymmetric

7. Hat is the other name for shell sort?

   a. Heap b. Insertion c. Diminishing increment d. quick

8. How many passes is required for k-way merging?

   a. n b. [log k (n/m)] c. log(n) d. log(m)

9. A graph, which has not more than one edge between a pair of nodes is called a _____ graph.

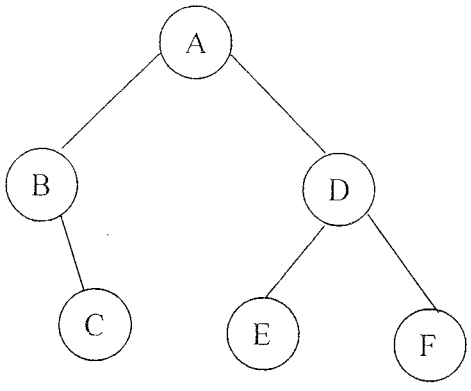
   a. directed b. undirected. c. simple d. weighted

10. A minimum spanning tree of an undirected graph G (with n vertices) is a t formed from graph edges that connect _____vertices of G at the lowest total cost

a. all b. half of the c. n-1 d. n-2

PART B (10 x 2 = 20 Marks)

11. List down any four applications of data structures.
12. Define Structure and Union.
13. Write the 'C' function for insertion in a queue.
14. What is the significance of priority queue?
15. Construct a binary tree for the following infix expression: A+B*C/D
16. Perform post order traversal for the following binary tree.



17. What is the main idea of Bubble sort?
18. Name some of the external sorting methods.
19. What is meant by strongly connected graph and weakly connected graph?
20. What are the two traversal strategies used in traversing a graph?

PART C (5 x 14 = 70 Marks)

21 (a) How do you implement union, structures and arrays in C? Explain with suitable examples.

(OR)

(b) (i) Give the memory representation and the equations for calculating the address of required element in the following arrays. (8)

1. One-dimensional array of size 'n'
2. Two-dimensional 'm x n 'array (for both row major order and column major order)

(ii). Explain 'Call by value' and 'Call by reference' with suitable example C program. (6)

22 (a) (i) Write an algorithm for transforming infix expression into postfix expression. (6)

(ii) Using the above algorithm transform the following infix expression 'Q' into its equivalent postfix expression 'P'.

Q: A + (B * C - (D / E ↑ E) * G) * H

Show the status of the stack and the sting 'P'. (8)

(OR)

(b) (i) Define a header node in doubly linked list. How do you perform polynomial addition using doubly linked list? Compare with circular linked list.

23 (a) (i) Create a Binary Search Tree for the following numbers. Start from an empty BST. 45,27,11,64,70,30,40 Delete keys 11, 64 and 45 one after the other and show the tree at each stage. (7)

(ii) What are threaded binary trees? Write 'C' procedure for inserting a node in a threaded binary tree. (7)

(OR)

(b) (i) Develop a C program to implement array representation of binary tree. Discuss how expression tree is evaluated (using C procedure.) (10)

(ii) What are the applications of binary tree structure? (4)

24 (a) Explain Heap sort.

(OR)

(b) Explain Insertion sort with example.

25 (a) Explain spanning and minimum spanning tree.

(OR)

(b) Explain C Representation of graph.

****