

Reg. No. :

**Question Paper Code : 21324**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Third Semester

Petrochemical Technology

CS 3206 — DATA STRUCTURES

(Common to CS 1201 Data Structures for Electrical and Electronics Engineering, Electronics and Communication Engineering, Electronics and Instrumentation Engineering Instrumentation and Control Engineering, Information Technology, Petrochemical Technology and Computer Science and Engineering)

(Regulation 2008)

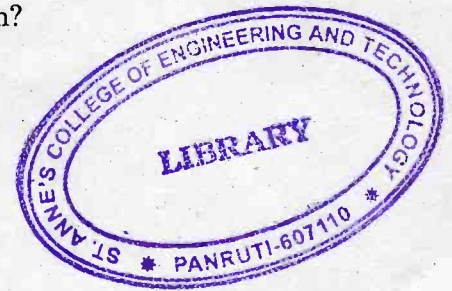
Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the resources deciding the efficiency of an algorithm?
2. Which of the following one is efficient? Why?
  - (a) `count = 0;`  
`for (i= 1;i<100;i++)`  
`count = count +i;`
  - (b) `for (count = 1; count <100; count ++);`
3. How is a circular queue implemented in a linear array?
4. Is it easier to insert a new node before or after a specified node in a linked list? Why?
5. How do you find the second smallest and the third smallest item in a heap?
6. What does a binary search do if it is applied to an array that is not ordered by search key?
7. Write any two graph applications.
8. Define a flow problem.
9. What is reference count method?
10. Why is the algorithm for finding shortest distances called greedy?



PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the methods for problem solving? Explain. (8)  
(ii) Explain the various factors to be considered in implementing an algorithm. (8)

Or

- (b) (i) Explain Top-down design strategy in detail. (8)  
(ii) For a  $(n \times n)$   $(n \times p)$  matrix multiplication, analyze the complexities. (8)
12. (a) Write an algorithm to delete the node p from a linked list when you are given only the pointer p without second pointer in lock step. (8+8)  
(i) Use the device of copying information fields from one node to another in designing your algorithm.  
(ii) Will your algorithm work when p is the first or the last node in the list? If not, either describe the changes needed or state why it cannot be done without providing additional information to your algorithm.

Or

- (b) For a stack write the steps of implementing an algorithm for the evaluation of the postfix expression given below (16)

$$x = 6 \ 2 \ 3 \ + \ - \ 3 \ 8 \ 2 \ / \ + \ * \ 2 \ \$ \ 3 \ +$$

and find the value of x.

13. (a) (i) Write an algorithm for a two way merge sort using a linked allocation technique. (8)  
(ii) Distinguish between Internal sorting and External sorting with relevant examples. (8)

Or

- (b) (i) Write an algorithm  
(1) to delete an item from hash table (5)  
(2) to insert an item into a hash table. (5)  
(ii) Show the representation of list as binary tree. (6)

14. (a) (i) Write any algorithm to produce the shortest path in a a weighted graph and explain with example. (10)  
(ii) What is transitive closure? Illustrate. (6)

Or

- (b) (i) What is minimum spanning tree? Explain prim's algorithm with example. (10)  
(ii) Describe any graph traversal. (6)
15. (a) Define doubly linked list. Explain its operations, insert, delete and traversal with illustration.

Or

- (b) Write short notes on  
(i) Reference count method in list management. (8)  
(ii) Garbage collection and compaction. (8)
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