

Reg. No. :

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S 4021

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2007.

Second Semester

(Regulation 2004)

Computer Science and Engineering

CS 1151 — DATA STRUCTURES

(Common to Information Technology)

(Common to B.E (Part-Time) – First Semester – Regulation 2005)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is an algorithm?
2. What is program verification?
3. Convert the infix expression to postfix :
 $(a + b \wedge c \wedge d) * (e + f / d).$
4. List few applications of queues.
5. Construct an expression tree for the expression :
 $(a + b * c) + ((d * e + f) * g).$
6. What is hashing?
7. What is the time complexity of Insertion sort algorithm?
8. Differentiate between internal sorting and external sorting.
9. What are articulation points?
10. Define NP-complete problem?

PART B — ($5 \times 16 = 80$ marks)

11. (a) Discuss in detail about the various aspects of problem solving.

Or

- (b) State and explain the algorithm to convert a decimal integer to its octal equivalent. Trace the algorithm with an example.

12. (a) Given a singly linked list L, formulate separate routines/algorithms to

- (i) insert an element X after a position P in the list. (8)
- (ii) delete the first occurrence of an element Y from the list Trace the routine/algorithm with an example. (8)

Or

- (b) (i) Formulate a routine in C/C++ to implement a stack using a linked list and to pop an element from the stack. (8)
- (ii) Write a routine to implement a queue using arrays and to enqueue an element into it. (8)

13. (a) (i) Given an Unix file system as an input, formulate a routine to list a directory. (8)
- (ii) Write a routine/algorithm to insert an element into a binary search tree. (8)

Or

- (b) (i) Discuss in detail about the working of different hashing functions. (10)
- (ii) Write a function to perform deletion of an element from a binary heap. (6)

14. (a) State and explain the algorithm to perform Heap sort with an example.

Or

- (b) State and explain the algorithm to perform Merge sort with an example.

15. (a) State the pseudo code for Dijkstra's algorithm. Trace the algorithm with an example.

Or

- (b) (i) State the Kruskal's algorithm to compute the MST of a graph.
- (ii) Write short notes on Biconnectivity.