

S. E 17
IV

Data Structure & Algorithms

1016106

CON/2175-06.

[REVISED COURSE]

TV-8142

(3 Hours)

[Total Marks : 100

- N.B.:** 1) Question number 1 is compulsory.
2) Attempt any four questions out of remaining six questions.
3) Assumptions made should be clearly stated.
4) Figures to the right indicate full marks.
5) Assume suitable data wherever required but justify the same.

1. a) (i) An algorithm runs given input of size n . if n is 4096, the runtime is 512 Millisecond. if n is 16384, the runtime is 1024 milisecond . What is the complexity? What is the big-O notation? (05)
(ii) A binary tree has 10 nodes. The inorder and preorder traversal . of the tree are shown bellow. Draw the tree. (05)
Preorder- JCBDEFIGH
Inorder- ABCEDFJGIH
- b) What are the different method of ' File I/O' in 'C' language? What different library functions are supported by 'C' language to do this? (10)
2. a) Discuss the different ways of representing the binary tree. How would you choose the representation? (08)
b) Write a program to creat 'STACK' Abstract Data Type using linked list implementation. ADT should support the following operations. (12)
(i) cretestack (ii) pushstack (iii) pushstack (iv) destroystack
3. a) Write an algorithm for Binary search method. Prove that it's efficiency Is $O(\log_2 n)$. (10)
b) Using modulo division method and linear probing, store the keys shown bellow, array with 19 elements. How many collisions occurred? What is the density of the list after all keys have been inserted?
224562, 137456, 214562, 140145, 214576,
162145, 144467, 199645, 234534, 199645,
4. a) Explain Heap sort with algorithm and complexity in all cases (10)
b) (i) Write an algorithm for breadth first traversal of graph. Explain with suitable example. (06)
(ii) Write short notes on B tree. (04)
5. a) Write an algorithm for shell sort. What is it's time complexity? Justify your answer. (08)
b) (i) Sort the following numbers using insertion sort. Show the output of each pass. (06)
23, 78, 45, 08, 32, 56, 18
(ii) Write short notes on 'Circular and Priority queues'. (06)
6. a) Give psudocode for Huffman algorithm and apply the Huffman encoding method for following sentence ' MAHARASHTRA' (08)
b) Write a program to creat 'QUEUE' Abstract Data Type using linked list implementation. QUEUE ADT should support the following operations. (12)
(i) create queue (ii) Insert into queue (iii) delete from queue
(iv) destroyqueue

7. a) Write an algorithm to delete the node from given Binary search tree (08)

Explain logic with suitable example.

b) Write short notes on – (12)

i) Dynamic programming.

ii) Greedy Method.

iii) Macro in 'C'.
