

Total No. of Questions—8]

[Total No. of Printed Pages—4

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**[4757]-1072**

**S.E. (Computer) (First Semester) EXAMINATION, 2015**

**DATA STRUCTURES AND PROBLEM SOLVING**

**(2012 COURSE)**

**Time : Two Hours**

**Maximum Marks : 50**

- N.B. :-**
- (i) Answer Q. No. 1 or Q. No. 2, Q. No. 3 or Q. No. 4, Q. No. 5 or Q. No. 6, Q. No. 7 or Q. No. 8.
  - (ii) Neat diagrams must be drawn wherever necessary.
  - (iii) Figures to the right side indicate full marks.
  - (iv) Assume suitable data, if necessary.

1. (a) Write a pseudo 'C' code to implement quick sort. Derive time complexity of quick sort in best and worst case. [6]
- (b) Derive the code for the following message using Huffman encoding 'A B R A K A D A B R A'. [6]

*Or*

2. (a) Sort the following data using merge sort : [3]
- [10, 5, 15, 3, 20, 1, 30, 9].
- (b) Write recursive function to calculate  $a^b$ . [3]

P.T.O.

- (c) Create a binary tree from the following inorder and postorder traversals. Also write preorder traversal of the constructed tree : [3]

Postorder	Inorder
I	D
D	I
H	C
G	G
C	H
F	B
B	F
E	A
A	E

- (d) What is binary tree ? How is it different from a basic tree ? Explain with figures. [3]

3. (a) Write algorithm for Breadth First Traversal of the graph. Also write its complexity. [6]

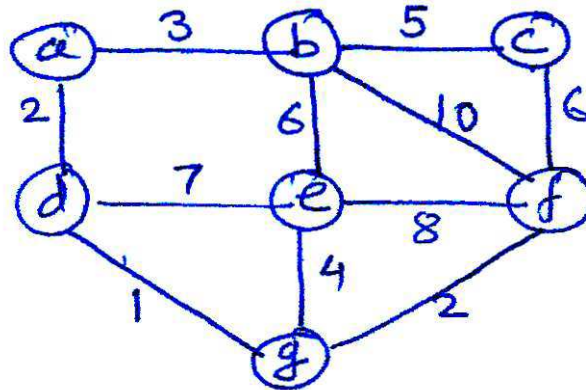
- (b) Construct the AVL tree for the following data :

20, 1, 2, 25, 15, 70, 30, 75, 10, 35.

Show clearly rotation used. [6]

Or

4. (a) Find the shortest path from  $a$  to  $f$ , in the following graph using Dijkstra's Algorithm. [6]



- (b) Write 'C' code for the following function w.r.t. AVL tree :
- (i) Rotate Left
  - (ii) Rotate Right. [3]
- (c) For the hash table size of 10 using hash function  $F(\text{key}) = \text{key} \% 10$  insert the following keys :
- 65, 75, 25, 29, 85, 39, 36.
- Use linear probing with chaining. [3]
5. (a) Sort the following data in descending order using heap sort
- 85, 15, 25, 95, 145, 55, 165, 75.
- Show all steps. [5]
- (b) Construct B+ tree of order 3 for the following data : [4]
- 10, 2, 30, 5, 90, 100, 50, 75, 35, 25.
- (c) Write 'C' program to read 10 integers from keyboard and store them in the file "My File". [4]

*Or*

6. (a) Create Min Heap for the following data using repeated insertion method 5, 7, 2, 3, 9, 1, 10. [4]
- (b) What is B tree ? Explain the procedure to delete node from B tree. [3]
- (c) Explain random access file and sequential file. [3]
- (d) Explain the following operation on sequential file :
- (i) Creation
  - (ii) Read
  - (iii) Insert. [3]
7. (a) Find the largest number among the following using parallel computation : [6]
- 10, 3, 2, 8, 30.
- (b) Write a parallel algorithm for odd even merge sort. [4]
- (c) Explain in detail parallel computation model. [3]

*Or*

8. (a) Explain the list ranking problem. Explain with example how will you solve it using pointer jumping techniques. [6]
- (b) Compute prefix sum (8, 2, -1, 5) using binary tree techniques. [4]
- (c) Write notes on : [3]
- (i) CRCW
  - (ii) EREW
  - (iii) CREW.