Total No. of Questions—8] [Total No. of Printed Pages—4

Seat No.	

[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]

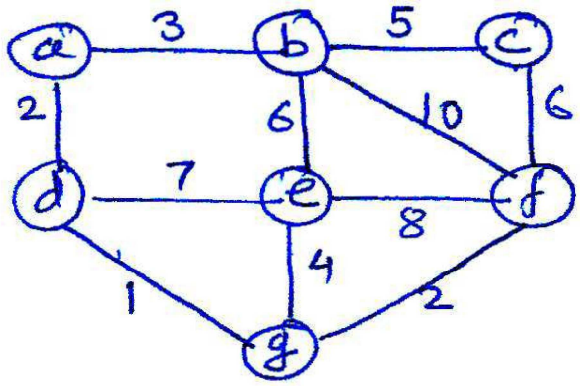
(*b*) Construct the AVL tree for the following data :

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 key F(key) = 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.