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

Seat No.	

[5057]-252

S.E. (Computer) (First Semester) EXAMINATION, 2016

DATA STRUCTURE AND PROBLEM SOLVING

(2012 PATTERN)

Time : Two Hours **Maximum Marks : 50**

N.B. **:—** (*i*) Attempt 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 indicate full marks.

(*iv*) Use of non-programable electronic pocket calculator and steam tables is allowed.

(*v*) Assume suitable data, if necessary.

1. (*a*) Explain big-oh, omega and theta notation with example. [4]

(*b*) Sort the following numbers using quick sort :

44, 75, 23, 43, 55, 12, 64, 77, 33.

State its time complexity and space complexity. [4]

(*c*) Explain an algorithm of Merge Sort with suitable example. [4]

Or

2. (*a*) Explain circular queue using link list. Write C code for enque operation. [4]

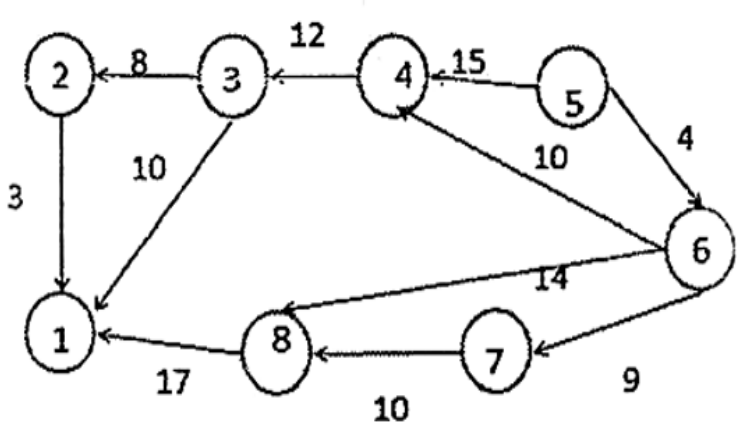
P.T.O.

(*b*) Suppose character a, b, c, d, e, f have probabilities 0.7, 0.9, 0.12, 0.22, 0.23, 0.27 respectively. Find optimal huffman code and draw huffman tree. What is the average code length ? [8]

3. (*a*) Explain the following terms of the below given graph :

(*i*) In degree of and out degree of each vertex.

(*ii*) Adjancy list representation. [4]



(*b*) Explain the algorithm for depth first search for graph. [4]

(*c*) What is Threaded Binary Tree (TBT) ? Explain the TBT for in order and pre-order traversal. [5]

Or

4. (*a*) Construct the AVL tree for the following data by inserting each data item one at a time 3, 2, 1, 4, 5, 6, 7, 16, 15, 14. [6]

(*b*) What is OBST ? List binary search tree with three words (w1, w2, w3) = (do, if, stop) wors occur with probabilities (p1, p2, p3) = (0.4, 0.5, 0.1). Find the expected access time in each case. [7]

5. (*a*) Create B-tree of order 4 for the following data : [6]

5, 3, 21, 9, 1, 13, 2, 7, 10, 12, 4, 8, 2, 21, 10.

(*b*) What is Max Heap ? Sort the following data in ascending order using Heap Sort 15, 19, 10, 7, 17, 16. [7]

Or

6. (*a*) What is B+ Tree. Construct B+ tree of order 4 for the following data : [5]

4, 7, 10, 17, 21, 31, 25, 19, 20, 28, 42.

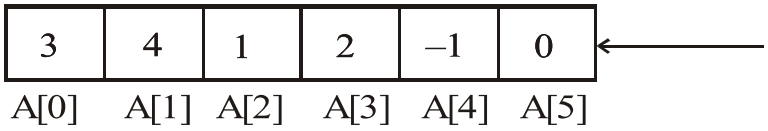
(*b*) Explain Quadratic probing and rehashing with a suitable example. [4]

(*c*) Discuss the following operation on sequential file with their basic primitives in c Creation, Reading, Insertion, Deletion. [4]

7. (*a*) Calculate prefix sum of given list using pointer jumping : [4]

(5, 3, 2, 7, – 4, 5).

(*b*) Consider the input as given below, calculate rank of each node. [4]



(*c*) Explain the various models used for parallel computation. [4]

Or

8. (*a*) Explain Odd even merge sort with a suitable example. [4]

(*b*) Write parallel algorithm to perform the addition of given number using complete binary tree method. Solve the following example 8, 4, –3, 2 for addition using compete binary tree. [8]