May - 2016

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

| Seat No. | |
|---|---|

# [4957]-1072

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

## DATA STRUCTURES AND PROBLEM SOLVING

## (2012 PATTERN)

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

***N.B.*** :— (*i*) Neat diagrams must be drawn wherever necessary.

(*ii*) Figures to the right indicate full marks.

(*iii*) Use of calculator is allowed.

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

**1.** (*a*) Find upper bound for [4]

$$F(n) = 3n + 8$$

and lower bound for

$$F(n) = 5n^2.$$

(*b*) Show the operation of bucket sort on the array : [4]

A = (0.36, 0.15, 0.20, 0.89, 0.53, 0.71, 0.32).

(*c*) What is ADT ? Write ADT for priority queue. [4]

*Or*

**2.** (*a*) What are the difficulties in problem solving ? Explain any *four* steps in problem solving with suitable example. [4]

P.T.O.

(*b*) Write an algorithm for reversing string, also mentioned time and space complexity for the same. [4]

(*c*) Explain the following terms with respect to hight balanced tree : [4]

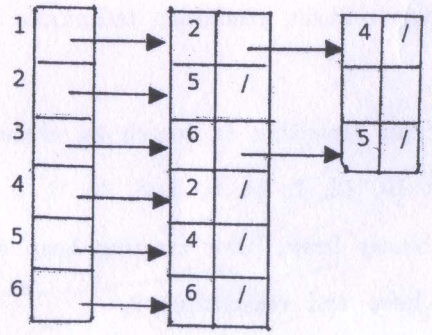
(*i*) L L

(*ii*) R R

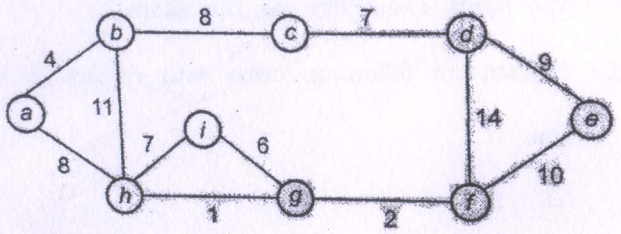
(*iii*) L R

(*iv*) R L.

**3.** (*a*) Consider the following graph representation using adjacency matrix and mention the difference between BFS and DFS : [4]



(*b*) Find the minimum spanning tree of the following graph using Kruskals algorithm. [4]




(*c*) Write are the characteristics of good hash function. [4]

*Or*

**4.** (*a*) With suitable example explain topological sorting. Also enlist application of topological sorting. [4]

(*b*) Create an AVL search tree from the given set of values : [4]

H I J B A E C F D G K L.

(*c*) What is collision with respect to hash function ? What are different collision resolution techniques ? [4]

**5.** (*a*) Write an algorithm to search an elements in B tree. [6]

(*b*) Insert 10, 12, 1, 14, 6, 5, 8, 15, 3, 9, 7, 4, 11, 13 and 2 into binary heap. After creating heap delete the element 8 from heap and reconstruct it. [7]



*Or*

**6.** (*a*) Explain random and sequential file in detail. [6]

(*b*) Write a pseudo C/C++ code to sort the data using heap sort in ascending order. [7]

**7.** (*a*) Write an algorithm for odd-even merge sort and explain it with suitable example. [6]

(*b*) What is prefix computation problem ? Explain in brief. [7]

*Or*

**8.** (*a*) State and explain pointer doubling problem with an example. [6]

(*b*) Write in brief about parallel computational model. [7]