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

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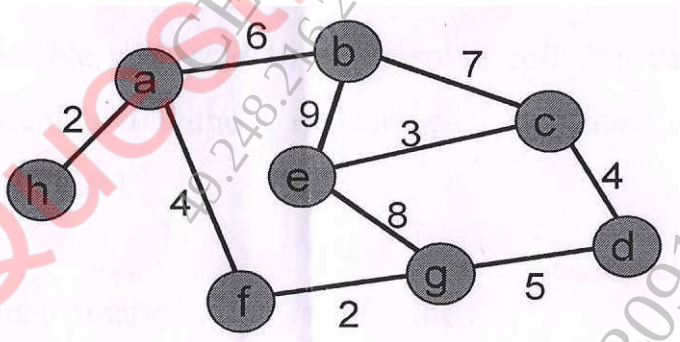
SE (Computer) (Second Semester) EXAMINATION, 2017
ADVANCED DATA STRUCTURES
(2015 PATTERN)

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

N.B. **:—** (*i*) Answer *four* questions
(*ii*) Figures to the right indicate full marks.
(*iii*) Assume suitable data, if necessary

1. (*a*) From the given traversals construct the binary tree. [4]
Pre-order : G, B, Q, A, C, K, F, P, D, E, R, H
In-order : Q, B, K, C, F, A, G, P, E, D, H, R

(*b*) Find the MST for the graph given using Kruskals Algorithm and show all the steps. [4]



(c) Construct Huffman's Tree and the prefix free code for all characters : [4]

Symbol	A	C	E	H	I
Frequency	3	5	8	2	7

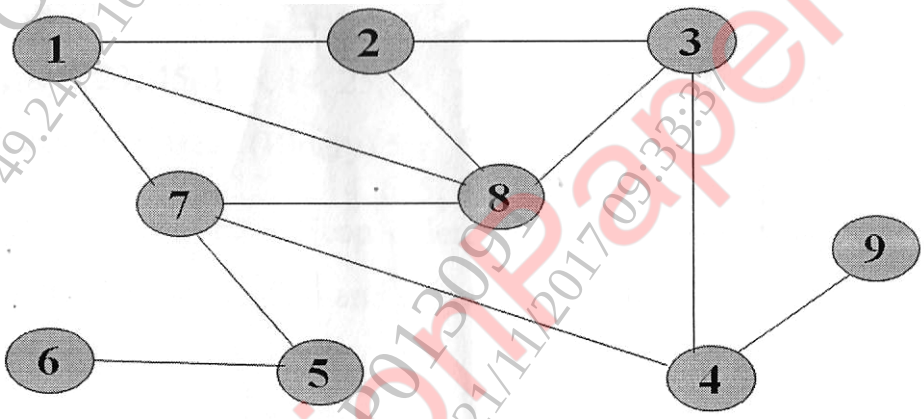
P.T.O.

Or

2. (*a*) For the binary tree represented as an array, perform in-order threading on the tree : [4]

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
A	B	C	D	E	F	G		H	I				J	K													L

(*b*) Define DFS and BFS for a graph. Show BFS and DFS for the following graph with starting vertex as 1. [4]



(*c*) Write pseudo-code for performing level order traversal of a binary tree. [4]

3. (*a*) Obtain AVL trees fro the following data : [6]

30, 50, 110, 80, 40, 10, 120, 60, 20, 70, 100, 90

(*b*) For the given set of values. [6]

11, 33, 20, 88, 79, 98, 44, 68, 66, 22

Create a hash table with size 10 and resolve collision using chaining with replacement and without replacement. Use the modulus Hash function. (key % size.)

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Or

4. (*a*) Find the Optimal Binary Search Tree for the : [6]

Identifier set {a1, a2, a3} = {do, if, while}

Where n = 3 and

Probabilities of successful search as {p1, p2, p3} = {0.5, 0.1, 0.05} and Probability of unsuccessful search as {q0, q1, q2, q3} = {0.15, 0.1, 0.05, 0.05}.

(*b*) What is hash function ? What are characteristics of good hash function ? Explain the different types of hash functions ? [6]

5. (*a*) Insert the following keys to a 5-ways B-tree : [6]

3, 7, 9, 23, 45, 1, 5, 14, 25, 24, 13, 11, 8, 19, 4, 31, 35, 56

(*b*) Create Min Heap (Binary) for

10, 12, 1, 14, 6, 5, 8, 15, 3, 9, 7, 4, 11, 13

After creating Min Heap delete element 1 from Heap and repair it. [6]

Then insert element 20 and show final result.

(*c*) Define Red-Black Trees [2]

Or

6. (*a*) State the need of B+ tree. Construct a B+ tree of order 5 for the following data : [6]

30, 31, 23, 32, 22, 28, 24, 29, 15, 26, 27, 34, 39, 36

(*b*) What is priority queue ? Explain the insert and delete operations for priority queues using heap data structure. [6]

(*c*) Define Splay trees. [2]

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7. (*a*) What is index sequential file organization ? State its advantages and disadvantages. [6]

(*b*) What is a File ? List different file opening modes in C++. Explain the concept of inverted files. [6]

Or

8. (*a*) Write a C++ program to create a file. Insert records in the file by opening file in append mode. Search for a specific record entered by user. [6]

(*b*) Compare index sequential and direct access files. [6]

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