

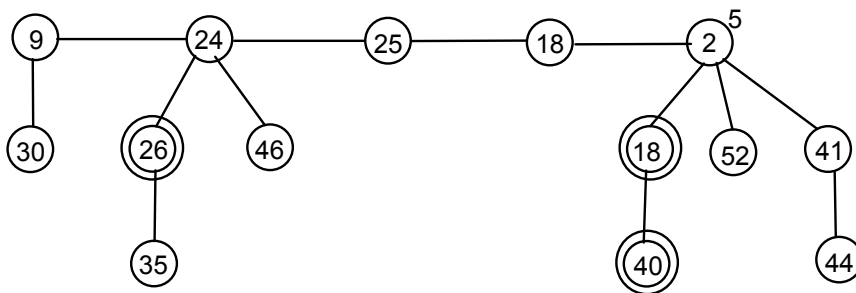
**M.Sc. Examination 2018**  
**Semester-I**  
**Computer Science**  
**Course : MCSC-12**  
**(Advanced Data Structure)**

**Time : 3 Hours**

**Full Marks : 40**

Questions are of value as indicated in the margin  
 Answer question No.1 and **any four** from the rest

1. a) What is a hash function? 2×4=8  
 b) What are the advantages of B<sup>+</sup> trees?  
 c) What is a red-black tree?  
 d) Find a slot for the key 3468 in the hash table of size 1000 using mid-square method.
2. a) Discuss how you can insert an element in a binary heap or a binomial heap. 4+4=8  
 b) Discuss deletion from a red-black tree.
3. Distinguish between linear probing and quadratic probing. Give examples. Discuss the advantages and disadvantages. 3+2+3=8
4. a) From the following Fibonacci heap delete-min operation is performed. Draw the resulting heap. 5+3=8



Marked nodes are indicated by double circles.

- b) Then replace node 46 by a node catching 15.
5. What is (a) a digital search tree (b) a binary trie (c) a compressed binary trie (d) a 1-bit tree? Give an example for each. 2×4=8
6. a) Draw the suffix tree for the word “peeper”. 4+4=8  
 b) How can you use multiway trie to implement IP routing.
7. a) Create a binomial heap H<sub>1</sub> with the keys 55, 64, 37, 46, 73, 71, 17, 28. 2+2+2+2=8  
 b) Create another binomial heap H<sub>2</sub> with the keys 45, 12, 13, 18, 72  
 c) Then merge the two heaps H<sub>1</sub> and H<sub>2</sub> obtained above to get the merged heap H.  
 d) Delete the minimum element from H.
8. Write short notes on any two of the following 4×2=8
  - a) Consolidation in a fibonacci heap
  - b) Heapify
  - c) M-way search tree