

5. (a) Give the recursive definition of pre-order traversal of a binary tree.
- (b) Construct a binary tree using the following information (in-order and post-order traversal) :
In-order Traversal : B A D F E G H C
Post-order Traversal : H G F E D C B A
Show all steps.
- (c) Write an algorithm to delete an element from a binary search tree which has either one child or has no children. 2+3+5
6. (a) Mention the criteria of binary search technique.
- (b) Compare linear and binary search techniques.
- (c) Prove that the height of a complete binary tree with n number of nodes is $\lceil \log_2(n+1) \rceil$. 2+3+5
7. (a) What do you understand by collision in hashing?
- (b) Discuss any two collision removing techniques.
- (c) Explain chaining with an example. 1+(3+3)+3
8. (a) Sort the following elements using Quick Sort technique in ascending order. Show all the steps.
40, 30, 20, 60, 45, 90, 70, 100.
- (b) Which sorting technique would you prefer among Quick sort and Merge sort and why? 6+4
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2019

COMPUTER SCIENCE — HONOURS

Paper : CC-3

Full Marks : 50

*The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.*Answer **question no. 1** and **any four** questions from the rest.

1. Answer **any five** questions : 2×5
- (a) Array is a linear data structure. — Justify your answer.
- (b) Define De-queue.
- (c) Mention two advantages of a threaded binary tree over a binary tree.
- (d) Mention one limitation and one advantage of recursion.
- (e) Name any four hashing techniques.
- (f) Write down any two advantages of circular queue over simple queue.
- (g) Compare selection sort and bubble sort with respect to time complexity.
- (h) Define binary search tree.
2. (a) Write an algorithm to insert an element in a circular queue.
- (b) Convert the following expression into its corresponding postfix expression using stack and evaluate it showing all the steps : 4+(3+3)
- $$10 + ((7 - 5) + 10) / 2 + 5 * 3$$
3. (a) Define min heap.
- (b) Construct a min heap with the following elements and then arrange it in ascending order : 200, 10, 90, 60, 100, 50, 150, 40, 20, 70.
Show all the steps. 2+(4+4)
4. (a) Discuss the storage structure of an array.
- (b) Represent the following polynomial using array and linked list and then compare them :
- $$P(x) = 5x^9 - x^2 + 9x - 50.$$
- (c) Write an algorithm to insert an element at the end of the linked list. 3+(1+1+1)+4

Please Turn Over