M 7550

Reg. No. : .....

Name : .....

III Semester B.Sc./B.C.A. Degree (CCSS – Reg./Supple./Imp.) Examination, November 2014

GENERAL COURSE IN COMPUTER SCIENCE/COMPUTER APPLICATION

3A14CSC/BCA : Methodology of Computer Science

Time : 3 Hours Max. Weightage : 21

SECTION – A

Answer **all** questions. Weightage for a bunch of **four** questions is **one** :

1. Which of the traversal techniques list the nodes of a binary search tree in ascending order ?
   a) Pre-order
   b) In order
   c) Post order
   d) None of the above

2. Write down the reverse-polish notation for
   A * (B * C – (D / E ^ F) * G) * H
   a) ABC * DEF ^ /G * – H * +
   b) AB + CD / – * EF ^ G * H *
   c) ABC * + DEF ^ / G * – H *
   d) ABC * DEF ^ / – G *+ H *

3. The number of swapping needed to sort the numbers :
   8, 22, 7, 9, 31, 19, 5, 13 in ascending order using bubble sort.
   a) 10 b) 12 c) 13 d) 14

4. Sparse matrix have
   a) Many non-zero entries
   b) Many zero entries
   c) Lesser zero entries
   d) None of these

5. What is the time complexity of selection sort in average case ?
   a) O (n)
   b) O (n log n)
   c) O (log n)
   d) O (n^2)

P.T.O.

6. Which of the following is essential for converting an infix expression to post fix ?
   a) Operand stack
   b) Operator stack
   c) Operand queue
   d) Operator queue

7. Number of nodes in a full-binary tree of depth k is
   a) 2^k b) 2^{k-1} c) 2^{k+1} d) $2^k - 1$

8. What is the relation between the functions f(n) and g(n) if there exists positive constants c_1, c_2 and n_0 such that $c_1 g(n) \leq f(n) \leq c_2 g(n)$ for all n, $n \geq n_0$?
   a) f(n) = Q(g(n))
   b) g(n) = Q(f(n))
   c) f(n) = O(g(n))
   d) g(n) = O(f(n)) **(2×1=2)**

SECTION – B

Answer **any 5** questions. Weightage **1 each** :

9. What are the two components which determine the space needed by a program ?
10. Define "Big-oh".
11. What is a queue ?
12. Define binary search tree.
13. Describe the array representation of sparse matrix.
14. What is linear search ?
15. Explain bubble sort.
16. Prove that f(n) = O(g(n)) where f(n) = n + 2n logn g(n) = n logn. **(5×1=5)**

SECTION – C

Answer **any five** questions. Weightage **2 each** :

17. Define array. How arrays can be represented in memory ? How the address of an element in a two-dimensional array is calculated.
18. Construct a binary tree whose nodes in inorder and pre-order are given below :

    Inorder : 10 15 17 18 20 25 30 35 38 40 50

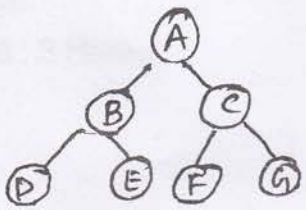
    Pre order : 20 15 10 18 17 30 25 40 35 38 50

19 Perform the worst case analysis of quick sort.

20. Write a procedure to reverse a singly linked list.

21. Describe the binary search technique. What is the maximum number of key comparisons in binary search.

22. Write a procedure for pre order traversal of a binary tree and execute it on the following tree.



23. Write an algorithm to insert a node between any two nodes in a linked list.

24. Write an algorithm to delete a given node from a doubly linked list. **(5×2=10)**

SECTION – D

Answer **any one** question. Weightage **4** :

25. Write an algorithm to find the solution for Tower's of Hanoi problem. Explain the working of your algorithm with 4 disks.

26. Write algorithms for the following on a queue implemented using array :

    a) Insert an element

    b) Delete an element. **(1×4=4)**
