Code No. 30697E   Sub. Code: SECA5B

B.C.A. (CBCS) DEGREE EXAMINATION, NOVEMBER 2020

FIFTH SEMESTER

Computer Application

Major Elective – DESIGN AND ANALYSIS OF ALGORITHM

(For those who joined in July 2017 onwards)

Time: Three hours   Maximum: 75 marks

Part A (10 x 1 = 10 Marks)
Answer all Questions, Choose the correct answer

1. A -------- graph consisting of a collection of trees is called a forest.
   a. Spanning
   b. rooted
   c. directed
   d. connected

2. Queue is a list in which items are always removed from the one end called the -------.
   a. top
   b. bottom
   c. front
   d. rear

3. A binary tree of height h has ----- leaves.
   a. 2
   b. 2^h
   c. 2^{2h}
   d. none

4. The expected time for Quicksort is
   a. O(n)
   b. O(n2)
   c. O(logn)
   d. O(nlogn)

5. Binary search makes -------- comparisons.
   a. log(n)
   b. log(n+1)
   c. log(n+3)
   d. none

6. The function --------- print the smallest element of set S.
   a. MIN(S)
   b. SMALL(S)
   c. PRINT(S)
   d. MINIMUM(S)

7. --------- edges which go between vertices that are neither ancestors nor descendents of one another.
   a. Tree
   b. Forward
   c. Back
   d. Cross

8. If (v,w) is a cross edge then v>w, cross edge go from ----------.

    a. left to right   b. right to left

    c.. top to bottom   d. bottom to top

9. A permutation matrix is a matrix of 0's and 1's such that each row and column

    has exactly ------

    a. 0   b. 1

    c. 2   d. 3

10. LUP decomposition method is used to solve simultaneous ------------.

    a. matrices   b. numbers

    c. polynomials   d. linear equations

PART B (5 X 5 = 25 MARKS)
Answer ALL questions, Choosing either (a) or (b)

11.a. Define graph. Write short notes on directed and undirected graph.
Or
b. What is recursion? Write the recursive procedure for inorder.

12.a. Prove that two n vertex trees are isomorphic in O(n) time.
Or
b. Explain Quicksort with example.

13.a. Write the fundamental operation on sets.
Or
b. Write the binary search algorithm and explain.

14.a. What is depth first search? Explain.
Or
b. Write short notes on biconnectivity.

15.a. Write the properties of ring as an algebraic structure.
Or
b. Briefly write about Strassen algorithm with example.

PART C (5 X8= 40 MARKS)
Answer ALL questions, Choosing either (a) or (b)

16.a. What is a tree? Give different representations of trees and explain.

Or

b. Explain Divide and Conquer in detail. Write the procedure to find maximum and and minimum.

17.a. Write the algorithm for lexicographic sort of strings of varying length and explain.

Or

b. Describe heapsort in detail.

18.a. Explain hashing in detail.

Or

b. Explain Optimal binary search trees in detail.

19.a. describe minimum cost spanning tree. Write its algorithm and explain.

Or

b. Describe shortest path algorithm with example.

20.a. Describe LUP decomposition of matrices with the procedure FACTOR.

Or

b. Describe inversion of matrices in detail.