Code No. 6083N

Reg. No:.....

Sub. Code: BCAM11

M.CA (CBCS) DEGREE EXAMINATION, NOVEMBER 2020

First Semester

COMPUTER APPLICATIONS

DESIGN AND ANALYSIS OF ALGORITHMS USING C++

(For those who joined in July 2020 onwards)

Time Three hours

Maximum: 75 marks

PART A – (10x1=10 marks)

Answer ALL the Questions, Choose the Correct answer

1. What does 'stack underflow' refer to?
   a) accessing item from an undefined stack
   b) adding items to a full stack
   c) removing items from an empty stack
   d) index out of bounds exception

2. To implement a stack using queue(with only enqueue and dequeue operations), how many queues will you need?
   a) 1 b) 2 c) 3 d) 4

3. Suppose we are sorting an array of eight integers using quicksort, and we have just finished the first partitioning with the array looking like this: 2 5 1 7 9 12 11 10 Which statement is correct?
   a) The pivot could be either the 7 or the 9
   b) The pivot could be the 7, but it is not the 9
   c) The pivot is not the 7, but it could be the 9
   d) Neither the 7 nor the 9 is the pivot

4. Strassen's matrix multiplication algorithm follows _____ technique.
   a) Greedy technique
   b) Dynamic Programming
   c) Divide and Conquer
   d) Backtracking

5. Kruskal's algorithm is a
   a) divide and conquer algorithm
   b) dynamic programming algorithm
   c) greedy algorithm
   d) approximation algorithm

6. What is the objective of the knapsack problem?
   a) To get maximum total value in the knapsack
   b) To get minimum total value in the knapsack
   c) To get maximum weight in the knapsack
   d) To get minimum weight in the knapsack

7. Which of the following pair's traversals on a binary tree can build the tree uniquely?
   a) post-order and pre-order
   b) post-order and in-order
   c) post-order and level order
   d) level order and preorder

8. Breadth First Search is equivalent to which of the traversal in the Binary Trees?
   a) Pre-order Traversal
   b) Post-order Traversal
   c) Level-order Traversal
   d) In-order Traversal

9. Which data structure is used for implementing a FIFO branch and bound strategy?
   a) stack b) queue c) array d) linked list

10. Choose the correct statement from the following:
   a) branch and bound is more efficient than backtracking
   b) branch and bound is not suitable where a greedy algorithm is not applicable
   c) branch and bound divides a problem into at least 2 new restricted sub problems
   d) backtracking divides a problem into at least 2 new restricted sub problems

Part B (5 x 5 = 25 Marks)

Answer all Questions, Choosing either (a) or (b), Each answer should not exceed 250 words

11. a) Write down the algorithm for Magic square.
   (or)
   b) Discuss about Graph representations.

12. a) Give an overview about finding the maximum and minimum.
   (or)
   b) Explain about Strassen's matrix multiplication.

13. a) Discuss about Prim's algorithm.
   (or)
   b) Classify 0/1 Knapsack.

14. a) Analyze Depth first search and traversal.
   (or)
   b) Write down the general iterative backtracking method.

15. a) Explain about FIFO Branch-and-Bound solution.
   (or)
   b) Write a note on Job shop scheduling.

Part C (5 x 8 = 40 Marks)

Answer all Questions, Choosing either (a) or (b), Each answer should not exceed 600 words

16. a) Briefly explain about Stack.
   (or)
   b) Analyze priority queues in detail.

17. a) Explain in detail about binary search.
   (or)
   b) Give an overview about quick sort.

18. a) Discuss about Kruskal's algorithm.
   (or)
   b) Write down the algorithm for sequencing unit time jobs with deadlines and profits.

19. a) Illustrate about techniques for binary trees.
   (or)
   b) Explain about connected components and spanning trees.

20. a) Write the Least Cost search algorithm.
   (or)
   b) Discuss about the classes NP-hard and NP-complete.

******* ALL THE BEST *******